

## ASSESSMENT OF FUNGAL PATHOGENS OF CAPSICUM IN NASHIK DISTRICT

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### ABSTRACT

Production and productivity of *Capsicum* is highly threatened by different diseases in Nashik District. However, the relative importance of each disease across locations has not been assessed and well profiled. To determine the occurrence, distribution and the status of *Capsicum* diseases in the region, survey was carried out in Nashik districts in different seasons. Economic losses caused by the disease are mainly attributed to lower fruit quality and marketability. Although infected fruits are not toxic to humans or animals, severely affected fruits showing blemishes are generally considered unfit for human consumption. Including Maharashtra management of the disease under the prevailing farming systems in India has become a present need of *Capsicum* growers. Results indicated that major fungal diseases of *capsicum* are caused by *Pythium aphanidermatum*, *Phytophthora spp.*, *Cercospora capsici*, *Alternaria solani*, *Colletotrichum capsici*, *Phytophthora spp.*, *Erysiphe cichoracearum*, *Leveillula taurica*, *Alternaria solani*, *Fusarium oxysporum* and *Phaeoramularia capsicicola*. The post-harvest 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; Chandha,2003; Gupta and Thind,2006).

The current study indicated that a complex of diseases exists in *Capsicum* and the occurrence across districts is highly variable despite introduction and promotion of different management practices. Therefore holistic and cumulative integrated approach is required to manage the complex diseases in the region.

**KEYWORDS:** *Capsicum*, Fungal Pathogens, Disease Complex

### INTRODUCTION

Genus *Capsicum* belongs to the family *Solanaceae* and is an important member of chilli group. It is variously called as *Capsicum*, green pepper, sweet pepper, bell pepper, etc. *Capsicum* which is also known as *Simla mirch* is consumed by almost every Indian. This is a rich source of vitamin A and C. It is consumed in different forms either by cooking or in raw stage as salad etc. Due to the mild pungency, it is tastier than the chillies. It is fleshy, blocky, of

various shapes, more like a bell and hence named bell pepper. The major *Capsicum* growing countries are India, China, Korea, Nigeria, U.S.S.R. Mexico, etc..(Hanamashetti *et al.*,2009). India accounts for 25% of the world's total production of *Capsicum* and ranks second among world *Capsicum* exporters. The crop is a significant source of income making India the world's single largest producer and exporter to the USA, Canada, UK, Saudi Arabia, Singapore, Malaysia, Germany and many more countries across the world. The sustainability of *Capsicum* based agriculture is threatened by a number of factors. Main biotic stresses such as bacterial wilt, anthracnose,

viruses and several insect pests have been reported to impair the crop productivity (Isaac, 1992). Anthracnose disease is a major problem in India and one of the more significant economic constraints to *Capsicum* production worldwide, especially in tropical and subtropical regions (Than et al., 2008).

The disease causes both pre- and post-harvest fruit decay (Bosland and Votava, 2003). *Capsicum* anthracnose usually develops under high humid conditions when rain occurs after the fruits have started to ripen with reported losses of up to 84% (Thind and Jhooty, 1985). Taking in to consideration this necessity the proposed work is decided to undertake systematic and scientific studies about pathogenic damages of this crop and convey the findings towards *Capsicum* growers to overcome these serious problems.

Farmers are facing problems of low yield and poor quality marketable produce due to various constrains like diseases, insect pests, lack of planting and management technology. Among these diseases are posing great threat to protected cultivation. So, the proposed work will be carried out to identify the pathological problems under protected conditions and open field cultivation because recently in study area (Nashik District, Maharashtra) the *Capsicum* growers have adopted polyhouse technology to meet the world demands like quality fruit and trying to get high price through export and cultivating *Capsicum* as cash crop. Polyhouse surveys were conducted during the year 2008-09 and 2009-10 at different localities and observations were recorded on the occurrence of different diseases on *Capsicum* the incidence of powdery mildew was recorded in epidemic form followed by bacterial wilt (5-40%), collar rot (10-20%) and cercospora leaf spots.

Fifty one different pathogens have been reported to cause diseases on various parts of chilli (Mukerji and Jayanthi Bhasin, 1996; Saha and Singh, 1988). Out of them, thirty nine belong to the fungi of classes Mastigomycotina, Ascomycotina and Deuteromycotina. Among the three major fungal diseases, anthracnose affects the yield directly by infecting fruits and indirectly by infecting stems and leaves and causing flower drop. Economic losses caused by the disease are mainly attributed to lower fruit quality and marketability.

## MATERIAL AND METHODS SURVEY AND SAMPLE COLLECTION

**Study Area:** Survey was conducted in Nashik district in cropping season. The surveyed zones were purposively selected to represent the major hot pepper growing areas of the region. The present work is proposed to investigate and convey the systematic and scientific findings towards the farmers.

**Sample Collection:** During the survey period naturally infected plants of different parts (root, stem, leaf and fruits) which showed suspected typical symptoms of different fungal diseases were collected. They are brought to laboratory for isolation and identification of the pathogen.

**Sample Isolation:** The sampled material was surface sterilized for 3 min with 1% NaOCl and rinsed four successive changes of sterilized distilled water. The surface sterilized parts showing symptoms of diseases were then sliced in 2mm<sup>2</sup> pieces and plated on to culture medium in petri dishes. The plates were incubated in an inverted position at 26-300<sup>c</sup> for five days. Then the isolated fungi were identified on basis of macro morphological and micromorphological characteristics.

## RESULTS AND DISCUSSIONS

During the current survey, 55% plants of *Capsicum* were infected with different diseases. The mean frequency of each disease symptom across the surveyed area was different among all pathogens. About 39% of assessed farms had *Alternaria* blight. Fusarium wilt and powdery mildew diseases occurred in 30% and 23% of the farms, respectively. As compared to other diseases, anthracnose, cercospora leaf spot-diseases occurred at very low frequencies of 12 % and 11%, respectively. *Alternaria* blight, *Fusarium* wilt and *Cercospora* leaf spot diseases were observed at all growth stages of the crop, while powdery mildew, anthracnose etc were observed at and after flowering, and fruiting stage of the crop.

Most of the diseases observed on hot pepper farms can be controlled by using recommended cultural practice like optimum rate of fertilizer, row planting, appropriate spacing, crop rotation and use of clean seed of improved varieties. However, in surveyed districts farmers' practices were variable and only few farmers apply recommended cultural practice.

## CONCLUSIONS AND RECOMMENDATIONS

Even though the yield loss caused by each pathogen is not studied and quantified. These surely indicate presence of fungal diseases in Capsicum field. In this study various fungal pathogens infecting Capsicum were observed across surveyed district. Among that 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., *As per gill us terre us*, *A. candidus*, *A. niger*, *Fusarium monili for me*) etc are occur more frequently in Capsicum producing area of Nashik District.

To avoid economical loss of farmers and increase the yield of crop it is necessary to attempt for development of resistance varieties, implementation of agronomic practices and more important awareness creation of farmers and experts for cultivation practice from selection of site upto post harvest handling on the importance of diseases and their management.

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