



Occurrence And Impact of Major Fungal Diseases on Chilli Crop During Different Growth Phases in Parbhani District

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Abstract:

The prevalence of the main fungal infections that harm chillies (*Capsicum annuum* L.) at the sapling, vegetative, and reproductive stages of crop growth is assessed in this study. Thirteen different fungus species with unique stage-specific occurrence patterns were identified. *Fusarium oxysporum* and *Sclerotium rolfsii* were the next most common soil- and seed-borne diseases that damaged the sapling stage, after *Phytophthora capsici* and *Rhizoctonia solani*, both of which had severe incidences. *Cercospora capsici*, *Colletotrichum capsici*, and *Leveillula taurica* recorded the highest prevalence during the vegetative stage, which demonstrated a high susceptibility to foliar diseases. Fruit-infecting fungus such *Alternaria alternata*, *Colletotrichum capsici*, and *Colletotrichum gloeosporioides* predominated during the reproductive stage, suggesting elevated disease pressure during yield-forming stages. Certain infections, such as *Fusarium solani*, did not appear at any stage of growth.

Keywords: Occurrence, Chilli, Fungal Diseases, Parbhani

Introduction:

In India, chilli (*Capsicum annuum* L.) is a major vegetable and spice crop. It is prized for its flavour, nutritional content, and financial significance. Many farmers in Maharashtra, particularly in the Parbhani district, make money from the extensive cultivation of chillies. However, a number of illnesses frequently impact the production of chillies, with fungal diseases causing significant harm and significant output losses. All phases of the chilli crop's growth, including the seedling, vegetative, and reproductive stages, are susceptible to fungal infections. Fruit rot, powdery mildew, damping-off, leaf spot, and wilt are common fungal diseases of chillies. Fungi including *Phytophthora capsici*, *Rhizoctonia solani*, *Fusarium oxysporum*, *Cercospora capsici*, *Colletotrichum capsici*, and *Leveillula taurica* are responsible for these diseases. The crop's growth stage, the weather,

and field management techniques all affect the incidence and severity of These Diseases.

Fungi that infect leaves are more prevalent during the vegetative stage and hinder plant growth by interfering with photosynthesis. Fruit-infecting fungi lower chilli quality and yield during the reproductive stage by causing fruit rot. The warm environment, heavy rains, and high humidity in the Parbhani district foster the growth and spread of fungal diseases. Despite the fact that chilli is a significant crop in this area, little is known about the prevalence and effects of fungal infections at different stages. For effective disease management, it is crucial to understand how fungal infections impact chillies at various phases of growth. Thus, the current study was conducted in the Parbhani area to investigate the prevalence and effects of major fungal infections on the chilli crop at various stages of growth.

Materials And Methods:

Diseased samples were gathered from local markets and chilli-growing farms in the Parbhani district. The symptoms of the infection on the leaves, stems, and fruits of the plant were critically examined. Samples exhibiting typical fruit rot symptoms were gathered from local markets and chilli-growing regions and brought to the study lab in plastic bags in order to isolate and identify the disease-causing microbes. The available literature, which included manuals and monographs, was used to identify isolated fungal types. Barnett and Hunter (1972), Ellis (1971), Thom and Raper (1945), Gilman (1959), Nagamani et al. (2006), and Mukadam et al. (2006).

Results:

The occurrence of major fungal pathogens of chilli was recorded at different crop growth stages, namely sapling, vegetative, and reproductive stages. The results revealed that the incidence and severity of fungal diseases varied considerably with the crop growth phase.

Phytophthora capsici and Rhizoctonia solani, both of which have a very high frequency, were found to be the cause of severe infection at the seedling stage. Pythium aphanidermatum, Alternaria alternata, and Verticillium dahliae

were found to have low to moderate occurrence, whilst Fusarium oxysporum and Sclerotium rolfsii displayed considerable incidence. At this point, a number of fungi were absent, including Alternaria solani, Cercospora capsici, Colletotrichum capsici, and Leveillula taurica.

Foliar pathogens predominated during the vegetative stage. Leveillula taurica, Colletotrichum capsici, and Cercospora capsici were shown to have a high occurrence. Alternaria alternata, Alternaria solani, Fusarium oxysporum, Pythium aphanidermatum, and Rhizoctonia solani were found to occur moderately. Phytophthora capsici and Sclerotium rolfsii, two soil-borne pathogens, were not seen at this stage.

Fruit and late-stage illnesses were more prevalent throughout the reproductive stage. Higher incidence was seen in Alternaria alternata, Colletotrichum capsici, Colletotrichum gloeosporioides, and Leveillula taurica. The prevalence of Alternaria solani, Verticillium dahliae, Sclerotium rolfsii, and Cercospora capsici was low to moderate. Certain fungi were absent during the reproductive stage, including Rhizoctonia solani, Phytophthora capsici, Pythium aphanidermatum, and Fusarium oxysporum. There was no evidence of Fusarium solani at any growth stage.

Fungal incidence on Chilly from Parbhani:

Name of Fungi	Crop Stages		
	Sapling	Vegetative	Reproductive
<i>Alternaria alternata</i>	+	+	++
<i>Alternaria solani</i>	–	+	+
<i>Cercospora capsici</i>	–	+++	+
<i>Colletotrichum capsici</i>	–	+++	++
<i>Colletotrichum gloeosporioides</i>	–	–	++
<i>Fusarium oxysporum</i>	++	+	–
<i>Fusarium solani</i>	–	–	–
<i>Leveillula taurica</i>	–	+++	++
<i>Phytophthora capsici</i>	+++	–	–
<i>Pythium aphanidermatum</i>	+	+	–
<i>Rhizotonia solani</i>	+++	+	–
<i>Sclerotium rolfsii</i>	++	–	+
<i>Verticillium dhaliae</i>	+	–	+

(+++)= High, (++) = Medium, (+) = Low, (–) = Absent

Discussion:

The current study unequivocally shows that the crop growth stage has a significant impact on the occurrence of fungal infections in chillies. At the seedling stage, soil-borne diseases like *Rhizoctonia solani* and *Phytophthora capsici* were predominant and caused serious infection. Tender plant tissues and ideal soil moisture levels, which encourage damping-off and root rot infections, could be the cause of this. The crop was more vulnerable to foliar fungal infections during the vegetative stage. Increased leaf area, high humidity, and ideal temperature conditions may be responsible for the high incidence of *Cercospora capsici*, *Colletotrichum capsici*, and *Leveillula taurica*. These infections inhibit plant growth and decrease photosynthetic activity, which eventually impacts production.

Fruit-infecting fungus such *Alternaria alternata*, *Colletotrichum capsici*, and *Colletotrichum gloeosporioides* were more common throughout the reproductive stage. Fruit rot and leaf spot development may be facilitated by favourable climatic conditions and physiological stress on plants, which could explain the increased prevalence of these diseases during this period. *Leveillula taurica* continued impact on the crop is indicated by its presence even in later stages. Given the characteristics of the research region, *Fusarium solani* may not be a major factor in the development of chilli disease, as evidenced by its absence throughout all growth stages. Overall, the findings highlight how crucial

stage-specific disease management techniques are. Reducing losses and increasing chilli yield requires prompt management of foliar and fruit diseases as well as early control of soil-borne pathogens.

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