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# Fungal Diseases of Chilli and their Management

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## SUMMARY

Chilli (Capsicum annum L) is an excellent source of vitamin A, B and C besides its pungency and medicinal uses. It is vulnerable to various fungal, bacterial and viral diseases which hampered its production and productivity. The disease can affect the yields through reduction of photosynthetic area in early stages and infestation on reproductive parts and economic produce at later stages. The disease causes a reduction on photosynthate flow in the plant (equivalent to blocking of pipes). The present topics will detail about the important fungal diseases of chilli their symptoms, epidemiology and management practices.

## INTRODUCTION

Chilli (*Capsicum annum* L.) is mainly cultivated for its vegetable green fruits and the dry chilli as the spice of commerce. It is a rich source of Vitamin C, A and B. Chillies are cultivated mainly in tropical and sub-tropical countries like India, Japan, Mexico, Turkey, United States of America and African countries. India is an important cash crop, which is grown for both the domestic and export market. India is the largest producer of chillies in the world (8.5 lakh tones) followed by China (4 lakh tonnes), Pakistan (3 lakh tonnes) and Mexico (3 lakh tonnes). India is well known as the land of spices the world over. Capsicum species are used as fresh or dried, whole or ground, and alone or in combination with other flavouring agents. *Capsicum annuum* L. is used in sweet bell peppers, paprika, pimento, and other red pepper products. The most notable feature of capsicum is its flavour which is an excellent source of vitamin A and C besides its pungency and medicinal properties. The capsicum is vulnerable to various bacterial, fungal and viral diseases, which are responsible for taking away a big chunk of production. The major fungal diseases are discussed below.

### Factors Influencing Disease Symptoms

- Host-parasite relation: The intensity of the disease depends upon the susceptibility / resistance of the host to the pathogen.
- Environmental factors: can be grouped as Soil borne seed borne and Air borne
- Soil borne: Soil pH, Structure, Texture Moisture, Organic matter, fertility, cultural operations, Irrigation.
- Seed Borne: Seed Moisture, Storage environment
- Air Borne: Temperature, RH, and Rainfall Wind.

### 1.Die Back/ Anthracnose:

**Causal organism:** *Colletotrichum capsici*

**Symptoms**: As the fungus causes necrosis of tender twigs from the tip backwards the disease is called die-back. Infection usually begins when the crop is in flower. Flowers drop and dry up. There is profuse shedding of flowers. The flower stalk shrivels and dries up. This drying up spreads from the flower stalks to the stem and subsequently causes dieback of the branches and stem and the branches wither. Partia1ly affected plants bear fruits which are few and of low quality.

**Epidemiology**: The pathogen overwinters in crop debris and infected seeds, fruits. The disease is favoured by cloudy weather, heavy rains and dew

**Management**

Use of disease-free seeds is important in preventing the disease

- Seed treatment with Thiram or Captan 4g/kg is found to be effective in eliminating the seed-borne inoculum.
- Good control of the disease has been reported by three sprayings with Ziram 0.25% or wettable sulphur 0.2% or copper oxychloride 0.25% or zineb 0.15%. The first spraying should be given just before flowering and the second at the time of fruit formation. Third spraying may be given a fortnight after second spraying. Chilli cultivar BG-1, Lorai and Perennial are found to be resistant against the disease

**2.Cercospora leaf spot :**

**Causal organism:** *Cercospora capsici*

**Symptoms**: Leaf lesions typically are brown and circular with small to large light grey centres and dark brown margins. The lesions may enlarge to 1cm or more in diameter and sometimes coalesce. Stem, petiole and pod lesions also have light grey centres with dark borders, but they are typically elliptical. Severely infected leaves drop off prematurely resulting in reduced yield.

**Epidemiology:** The fungus survives on seed and in crop residue. The conidia are disseminated by wind, rain or intercultural operation tools. The fungus sporulates abundantly at 20-300C, but reduces at 100C and stop at 400C.

**Management**

- Crop debris should be removed and burnt.
- Seed should be collected from healthy plants**.**
- Spray twice at 10-15 days interval with Mancozeb@0.25% or Chlorothalonil@0.1%., Captafol @03.% or Triadimefon @0.1%.

**3. Phytophthora Leaf Blight and Fruit Rot**

**Causal organism:** *Phytophthora capsici*

**Symptoms:** All the plant parts are affected and the severity of the disease varies depending upon the climatic conditions and locality. Fruit rot phase of the disease is highly destructive with water-soaked, dull green spots appear on the fruit, gradually expanded and becomes mummified. Leaf lesions are dark green, water-soaked, round or irregularly shaped area which expands rapidly.

**Epidemiology**: The pathogen survives in infected crop debris or the soil and association with other crops such as cucurbits, brinjal and tomato. Oospore serves as a survival structure. Warm temperature in combination with high humidity is favourable for disease development.

**Management:**

- Cultural practices such as crop rotation, timely roughing of diseased plants, parts, avoid contact of fruits and leaves to ground soil, use of disease-free seed, mulching with straw, earthling up of plants after transplanting are recommended.
- Biological control such as *Pseudomonas cepacia*, *Bacillus polymixa* and *Streptomyces violaceoniger* are effective against the disease.
- Application of fungicides such as a mixture of Metalaxyl-copper oxychloride, metalazyl-dithianon, Oxadixyl-Chlorothalonil has been reported effective in the control of both fruit rot and anthracnose.

**4. Fusarium Wilt**:

**Causal organism:** *Fusarium oxysporumf.sp.capsici*

**Symptoms** : *Fusarium* wilt is characterized by wilting of the plant and upward and inward rolling of the leaves. The leaves turn yellow and die. Generally appear as localized areas of the field where a high percentage of the plants wilt and die, although scattered wilted plants may also occur. By the time above-ground symptoms are evident; the vascular system of the plant is discoloured, particularly in the lower stem and roots.

**Epidemiology:** High temperature and wet soil conditions favour disease development and more severe in poorly drained soils. The organism grows and sporulation best at 20 to 300C
and 5 to 8 pH.

**Management**

- Use of wilt resistant varieties.
- Drenching with 1% Bordeaux mixture or Blue copper 0.25% may give protection.
- Seed treatment with 4g *Trichodermaviride* formulation or 2g Carbendazim per kg seed is effective.
- Mix 2kg *T.viride* formulation with 50kg FYM, sprinkle water and cover with a thin polythene sheet. When mycelia growth is visible on the heap after 15 days, apply the mixture in rows of chilli in an area of one acre.

**5.Powdery Mildew:**

The disease was first reported from Morocco in 1937.

**Causal organism***: Leveillula taurica*
**Symptoms**: First disease symptoms are noticed on the older leaves which progress to younger leaves. The infected leaf is covered with white to grey powdery masses of the fungus where lower leaf surface also turn necrotic. The heavy infection leads to leaf shedding resulting in heavy losses in yield.
**Epidemiology:** Cultivated and wild hosts such as *Cynaracardunculus, Cicerarietinum, Lucerne, Oxalis cerna*are the source of the pathogen during offseason. The optimum and maximum temperature for disease development is 200C. Temperature above 300C appears to be lethal for the fungus.
Shedding of foliage
**Management**
- Spray with Wettablesulphur@0.25% or Dinocap@ 0.05%2-3 times at 10 -15 days interval.
- Varieties such as B 15, R 7, Padasali, Tinwari, Golden Superior have been reported as moderately resistant.

### 6. Damping-Off

**Causal organism:** *Pythium aphanidermatum*
**Symptoms:** Symptoms appears as water-soaked lesions at the collar region, infected areas turn brown and rot and plants shrivel and collapse as a result of softening of tissues. Disease of nursery beds and young seedlings resulting in reduced seed germination and poor stand of seedlings.
**Epidemiology:** High soil moisture and relatively higher soil temperature favour the rapid development of the disease. The disease is further aggravated in ill- aerated soils with poor drainage having thick stand of the seedlings
**Management:**
- Soil drenching with Copper oxychloride 0.25%
- Avoid shade places for nursery establishment
- Use the recommended seed rate
- Avoid flooding type of irrigation and maintain the optimum moisture level in the nursery
- Use Thiram or Captan @ 4g/ kg of seeds for seed rate.

## CONCLUSION

The major fungal diseases of chilli are phytophthora leaf blight and fruit rot, anthracnose, cercospora leaf spot, powdery mildew and damping off. Knowledge about the different symptoms and epidemiology will help in the detection and diagnosis of different diseases. Leaf blight and fruit rot are highly destructive resulting in complete failure of the crop. Timely application of control measures such as application of fungicides can minimize the foliar diseases. Soil borne diseases can be reduced by crop rotation, soil solarization, growing resistant varieties and also application of biocontrol agents.

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