AgriCos e-Newsletter
ISSN: 2582-7049
AgriCos e-Newsletter
Open Access Multidisciplinary Monthly Online Magazine
Volume: 03 Issue: 05 May 2022 Article No: 15

# Integrated Disease Management Practices for Anthracnose Disease of Chilli

**Anik Majumdar**
PhD. Research Scholar, Department of Plant Pathology, Punjab Agricultural University, Ludhiana, Punjab

**SUMMARY**

Chilli is a widely consumed crop all over the world. Chilli anthracnose, on the other hand, is a major constraint in chilli production, resulting in massive economic losses around the world. This article aims to describe the differentsymptoms, epidemiology, disease cycle of the pathogenas well as concepts of integrated disease management practices (IDM) along with its various components such as cultural, chemical, biological controls and use of resistant cultivars.

## INTRODUCTION

Chilli (*Capsicum annum*) is one of India's most important crops due to the high value of its fruits in the spice and condiment industry. Chilli is not only an important component of Indian cuisine, but it also plays a significant role in the Indian economy. However, the crop is susceptible to a number of commercially important diseases, including damping off, dieback, *Choanephora* blight, fruit rot, leaf spots, leaf curl, wilt, etc. The most deadly of which is anthracnose/fruit rot. The disease is reported to cause around 10-54% yield loss in India (Lakshmesha *et al*., 2005; Ramachandran and Rathnamma, 2006).Management of these diseases using agrochemicals alone is neither cost-effective nor environmentally safe, thus it is necessary to control the diseases in an integrated approach that will assist the agricultural community in achieving a healthy and sustainable production.

**Causal Organism & Symptoms of disease**:

- The disease is caused by a hemibiotrophic pathogen *Colletotrichum capsici*. The pathogen produces typical circular or angular sunken lesions on fruit skin with concentric rings of acervuli that are often wet and produce pink to orange conidial masses.
- Under severe disease pressure, lesions may coalesce to cause ripe fruits turning red or pale white colour with lost pungency.

**Fig.1**- Fruit rot affected chilli

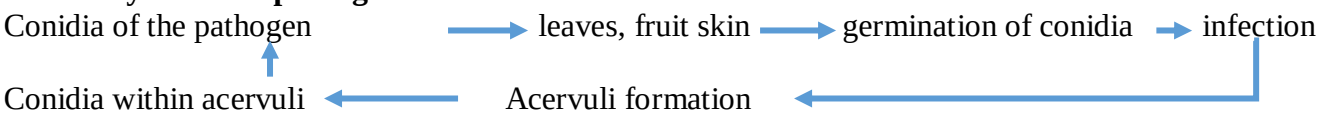
**Image source:** https://apps.lucidcentral.org/ppp/text/web_full/entities/capsicum_chilli_anthracnose_177.htm

**Epidemiology and spread of the disease**:

To design Integrated Disease Management (IDM) practices for a particular disease, knowledge about its epidemiology and spread is of utmost important.

- Roberts *et al*., (2001) reported that Temperature around 27°C with relative humidity of 80% are most congenial for successful establishment of the disease in a given area.
- The pathogen is externally seed borne. Montri *et al*., (2009) reported that the spores of *Colletotrichum capsici* surviveon seed in the form of acervuli and microsclerotia.

**Disease cycle of the pathogen**:




**Concept of IDM**:

IDM signifies management of diseases by combining different cultural, chemical & biological control methods in a sustainable way. There are six different principles of IDM-

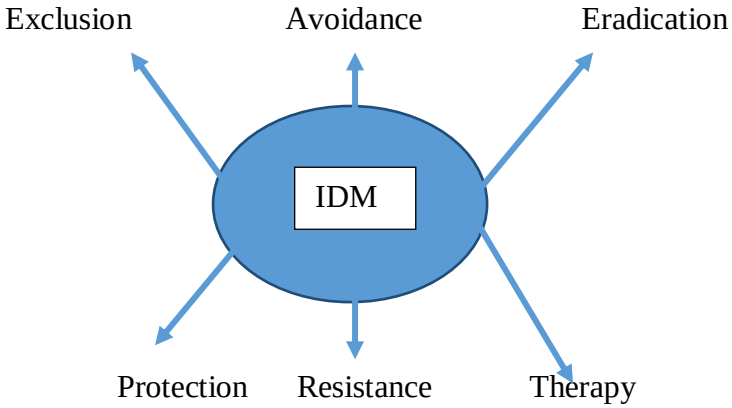



**Fig.2-** Principles of IDM

**Components of IDM**:

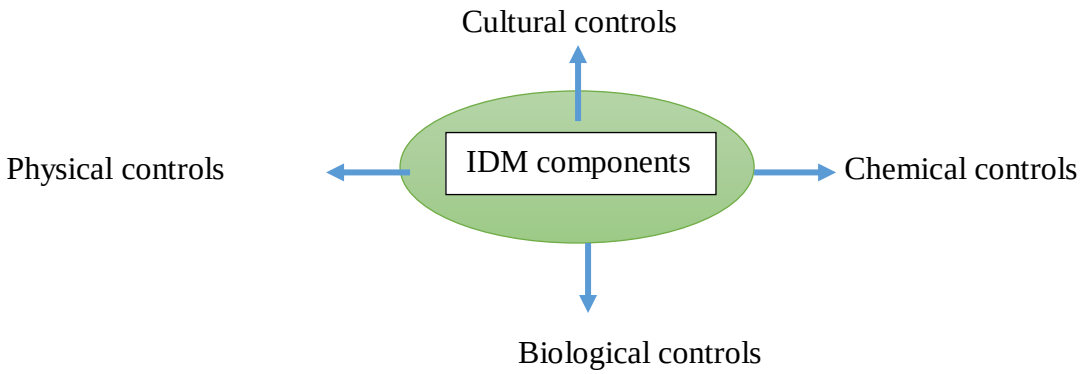



**Fig.3-** Components of IDM

**Management of the disease through IDM practices**:

**Cultural Controls:**

- Proper drainage, crop rotation and removal of any infected plant parts of the field should be done on regular basis.
- Than *et al.*, (2008) reported that, proper distance between the plants should be maintained to reduce dense canopy, which can create favourable environment for air borne spores to cause secondary infections.
- Vos *et al.*, (1995) reported that, Plastic mulching reduces the disease occurrence very effectively.

**Chemical controls:**

- Smith, (2000) reported that, maneb (Manganese ethylenebisdithiocarbamate) is the most commonly recommended fungicide for anthracnose management.
- Difenoconazole (0.025 percent) outperformed the other fungicides (Propiconazole, copper oxychloride, and Carbendazim + Mancozeb), resulting in the lowest disease intensity of 21.13% and the maximum fruit production. (Katedia *et al.*, 2019).

- Dubey *et al*., (2019) assessed five fungicides viz. Kasugamycin (Kasu B 3% SL), Pyraclostrobin + Metaram (Carbrio Top 60% WG), Azoxystrobin (Onestar 23 % SC), Fusilazole (Cursor 40% EC), and Folicur 250 EC (Tebuconazole) for their efficacy against *Colletotrichum capsici*using the Poison food technique, among which Cabrio Top 60% WG was found most effective.

**Biological controls:**

- For controlling the anthracnose pathogen, *Trichoderma* spp. Have been used widely. (Boonratkwang *et al*., 2007 and Singh *et al*., 2007).
- Manda *et al*., (2020) reported that *Pseudomonas fluorescens* can also be used against chilli anthracnose disease.

**Use of resistant varieties:**

Garg *et al*., (2014) reported various resistant varieties viz. BS-35, BS-20, BS-28, Punjab Lal, Bhut Jolokia, Taiwan-2, IC-383072, Pant C-1, and Lankamura collection to be effective against chilli anthracnose disease.

## CONCLUSIONS

Taking into account all of the features of IDM covered thus far, it can be stated that while developing any disease management plan, all of the basic ideas of IDM should be carefully evaluated. The first line of defence against any disease is cultural practises that promote vigorous but balanced plant development. Balanced irrigation and fertilisers are also vital, because succulent plant growth stimulates infections owing to excess water and nitrogen. IDM involves a long-term understanding of the ecosystem, and the strategy must fit into a farming system according to the disease management standards. Overall awareness of essential parts of a disease cycle will allow for improved disease management while keeping track of quality and quantity of the crop produced thereby producing satisfying yield.

## REFERENCES

Boonratkwang, C., Chamswarng, C., Intanoo, W., & Juntharasri, V. (2007, November). Effect of secondary metabolites from Trichoderma harzianum strain Pm9 on growth inhibition of Colletotrichum gloeosporioides and chilli anthracnose control. In *Proceeding of the 8th National Plant Protection Conference. Naresuan University, Phisanulok, Thailand* (pp. 323-336).

Dubey, P., Chandra, R., & Gupta, P. (2019). Effect of different fungicides against Colletotrichum capsici caused chilli anthracnose disease. *The Pharma Innovation Journal*, *8*(2), 414-416.

Garg, R., Loganathan, M., Saha, S., & Roy, B. K. (2014). Chilli Anthracnose: a review of causal organism, resistance source and mapping of gene. *Microbial diversity and biotechnology in food security*, 589-610.

Katediya, M. A., Jaiman, R. K., & Kumar, S. (2019). Management of chilli anthracnose caused by Colletotrichum capasici. *Journal of Pharmacognosy and Phytochemistry*, *8*(3), 2697-2701.

Lakshmesha, K. K., Lakshmidevi, N., & Mallikarjuna, S. A. (2005). Changes in pectinase and cellulase activity of Colletotrichum capsici mutants and their effect on anthracnose disease on capsicum fruit. *Archives of Phytopathology and Plant protection*, *38*(4), 267-279.

Manda, R. R., Pavithra, G., Addanki, V. A., & Srivastava, S. (2020). Anthracnose of Capsicum annuum L.(Chilli). *Int. J. Curr. Microbiol. App. Sci*, *9*(11), 749-756.

Montri, P., Taylor, P. W. J., & Mongkolporn, O. (2009). Pathotypes of Colletotrichum capsici, the causal agent of chili anthracnose, in Thailand. *Plant Disease*, *93*(1), 17-20.

Ramachandran, N., & Rathnamma, K. (2006, November). Colletotrichum acutatum—a new addition to the species of chilli anthracnose pathogen in India. In *annual meeting and symposium of Indian Phytopathological Society, Central Plantation Crops Research Institute, Kasarago*.

Roberts, P. D., Pernezny, K., & Kucharek, T. A. Anthracnose caused by Colletotrichum sp. on pepper—University of Florida/Institute of Food and Agricultural Sciences. 2001.

Singh, M. K., Akhtar, J., Kumar, A., & Khalid, A. (2007). Sensitivity of different isolates of Colletotrichum capsici to Trichoderma spp. *Journal of Eco-friendly Agriculture*, *2*(1), 54-55.

Smith, K.L. (2000). "Peppers", in *Ohio Vegetable Production Guide*, ed R.J. Precheur (Colombus, Ohio,OH: Ohio State University Extension), pp-166-173.

Than, P. P., Prihastuti, H., Phoulivong, S., Taylor, P. W., & Hyde, K. D. (2008). Chilli anthracnose disease caused by Colletotrichum species. *Journal of Zhejiang University Science B*, *9*(10), 764-778.

Vos, J. G. M., Uhan, T. S., & Sutarya, R. (1995). Integrated crop management of hot pepper (Capsicum spp.) under tropical lowland conditions: Effects of rice straw and plastic mulches on crop health. *Crop Protection*, *14*(6), 445-452.