J. Mycopathol. Res. **53(2)** : 267-270, *2015;* (ISSN 0971-3719)

Colletotrichum capsici- a new report of leaf spot disease of gerbera (*Gerbera jamesonii* Bolus) from Odisha

SWAGATIKA MOHANTY, NIBEDITA NAYAK AND SURJYA KANTA BEURA
Department of Plant Pathology, Orissa University of Agriculture and Technology, Bhubaneswar 751003, Odisha

Received : 12.12.2014 RMS Accepted : 01.06.2015 Published : 27.10.2015

Colletotrichum capsici, the incitant of leaf spot of gerbera (*Gerbera jamesonii*) is a serious foliar fungal pathogen encountered for the first time during *kharif* season in most of the plantation surveyed in the hot and humid coastal agro-ecological situations of the state of Odisha. The pathogen infected mainly the leaves and flower stalks and causing about 48% damage to the crop. The pathogen was isolated and identified as *Colletitrichum capsici.* It was further confirmed by Indian Type Culture Collection, New Delhi as *Colletotrichum capsici*(I.D. no.9269.13).The morphological and etiological study of the fungus along with its pathogenecity test have been carried out. The fungus produced dark brown colour globus and saucer shaped acervuli with numerous number of setae. The conidia were sickle shaped having an oil globule at the centre of the spore. The dimension of the setae was in the range of 123.37-170.75µm x 4.56-6.00 µm with the average of 140.97-4.506 µm and the dimension of the conidium was in the range of 20.87-25.63 µm x 2.43-2.56 µm with the range of 22.97 µm x3.28 µm.

Key words: *Colletotrichum capsici, Gerbera jamesonii,* leaf spot

INTRODUCTION

Gerbera jamesonii is a perennial flowering crop of Asteraceae family produce daisy like flower. It is ideal for flower beds, borders, pots and rock gardens. In Odisha, gerbera cultivation is in infant stage as it requires poly houses or glass houses for its production. But, in and around Bhubaneswar, the cultivation is being taken up in a large scale. A leaf spot disease was found to cause severe damage in flower production particularly after the cyclone 'Phailin' which hit the coastal Odisha in October 2013. Therefore, an attempt has been made to identify the pathogen through normal procedures and subsequent studies have been undertaken on the pathogen.

MATERIALS AND METHODS

A mixed plot survey was done during 2012-14 in different gerbera growing polyhouses and glass houses located in Bhubaneswar. Different kinds of leaf spot were noticed in course of survey. There were severe occurrence of foliar diseases observed after occurrence of cyclone "Phailin" in the month of October in 2013. Most of the gerbera crop of the polyhouses were totally devastated. Severe disease symptoms were observed in the plant. Mainly symptoms were observed in leaves and petioles. The total number of the plants in a plot was recorded and randomly selected plant was scored for the disease severity by following 0-5 point scale.

Scale	Description
0	No symptoms on leaf
1	Up to 1% of leaf area covered by lesions
2	1-10% of leaf area covered by lesions
3	11-25% of leaf area covered by lesions
4	26-50% of leaf area covered by lesions
5	> 50% of leaf area covered by lesions

Per cent Disease Index(PDI) was calculated by using formula(Wheeler, 1969)

$$PDI = \frac{\text{Sum of individual disease rating X100}}{\text{Total number of leaves observed X maximum disease scale}}$$

During the survey, the characteristic symptoms of the foliar disease were recorded and also the samples were collected.

Collection of the disease sample

Disease samples were collected from polyhouses of Tissue culture laboratory of OUAT, orchards, home gardens, nurseries, polyhouses of commercial cultivation present in and around Bhubaneswar.

Isolation of the pathogen

The leaves showing typical disease symptoms were collected as disease samples. The infected leaves were cut into small bits containing infected portions as well as healthy portions. These bits were sterilized with 0.5% sodium hypochlorite for 2 minutes and then washed serially thrice in sterilized distilled water for 2 minutes each to remove the traces of surface disinfectants. Then the bits were transferred to sterilized Petri plates (four bits at four corners) containing potato dextrose agar by sterilized forceps. The Petri plates were kept for incubation at room temperature at 27±1°C and observation was taken periodically. After 4 days of incubation, pure colony of mycelium was observed at four corner of Petri plate. From that pure colonies hyphal bits were transferred to PDA slants by the help of a sterilized inoculation needle and incubated at room temperature for 15 days.

Hyphal tip isolation

Hyphal tip isolation method was used for maintenance of pure culture. Water agar medium was used for this method. Dilute spore suspension was made by suspending spores in sterile distilled water. One ml of the suspension was spread uniformly on the plate containing 2% water agar and excess of the suspension was aseptically drained. Single germinated spore was marked and transferred to the PDA slant under aseptic condition. The slants were incubated at room temperature for 7 days after which subsequent transfer of hypha was made from the slants to the Petri plates containing PDA medium in aseptic condition. The plates were incubated at room temperature for 10 days. No saltation or sectoring was observed. Such culture was used for further studies.

Identification of the culture

The culture obtained was compared with the original description of the fungus for morphological characters. The culture was further sent to Indian Type Culture Collection, IARI, New Delhi for identification. The morphological characters like shape, size, colour of mycelium, conidiophores, conidia, setae and branching habit of hyphae were noted. Microphotograph of the mycelium, conidia and setae was taken and measurement of the conidia and setae were taken with the help of computer generated micrometer.

Proving pathogenecity

Pathogenecity was proved on local variety of gerbera plant(*Gerbera jamesonii*). The healthy plants were raised in earthen pots. Sixty days old plants were sprayed with distilled water then they were covered with polythene bags for 24 hrs. Two methods were used for inoculation.

1.The leaves of the plants were injured slightly by pricking with the help of sterilized needle. The leaves were then sprayed with suspension containing mycelial bits ($1x10^6$ CFU per ml suspension) of the fungus which was prepared in sterilized water. The control plants were sprayed with only sterilized distilled water. After spraying, all the plants were covered with polythene bags and kept inside a glass house at 25 °C and 95% RH. Observation on occurrence of disease symptom was recorded regularly.

2. Some places on the leaf lamina were selected and they were marked by ink. Then the marked portion were smeared with mycelial bits by using a cotton plug. Similarly control plants were smeared with distilled water for comparision. The symptoms appeared after 9 days of inoculation and reisolation was made from such spots .The obtained isolate

was compared with the original culture for confirmation.

RESULTS AND DISCUSSION

Colletotrichum leaf spot was found to be a major disease of gerbera affecting the foliages during the vegetative as well as the reproductive stage(Fig. 1). Occasionally the disease was also associated with the flower stalks which resulted in deterioration of the market value of the produce. Records of leaf spot of gerbera and other ornamental crops caused by *Colletotrichum capsici* has been reported earlier by many workers (Tomioka *et al.*, 2008; Dubey and Singh, 2006. Ghosh *et al.*, 2009).

The symptomatology in field conditions was presence of circular to irregular sunken spots with dark brown to black margins. Under favourable weather conditions, the spots united with each other resulting in complete withering of the plant (Fig.1). The disease occurred in acropetal succession and occasionally infected the reproductive parts also.

The pure culture of the fungus was maintained in potato dextrose agar medium. The culture was identified as *Colletotrichum capsici* by Indian Type Culture Collection, IARI, New Delhi (I.D. No.9269.13).

On pathogenecity, the causal fungus could induce the typical symptoms on the potted test plants at 24 days of artificial inoculation in green house conditions. However, the plants without inoculation (control) did not exhibit any such symptoms.

Morphological studies were undertaken in detail. The acervuli were globous to saucer shaped, dark brown in colour with large number of dark brown setae. The setae measured 140.973 mmx4.506 mm and the sickle shaped conidia having an oil globule measured 22.97 mm x 3.28 mm as revealed from

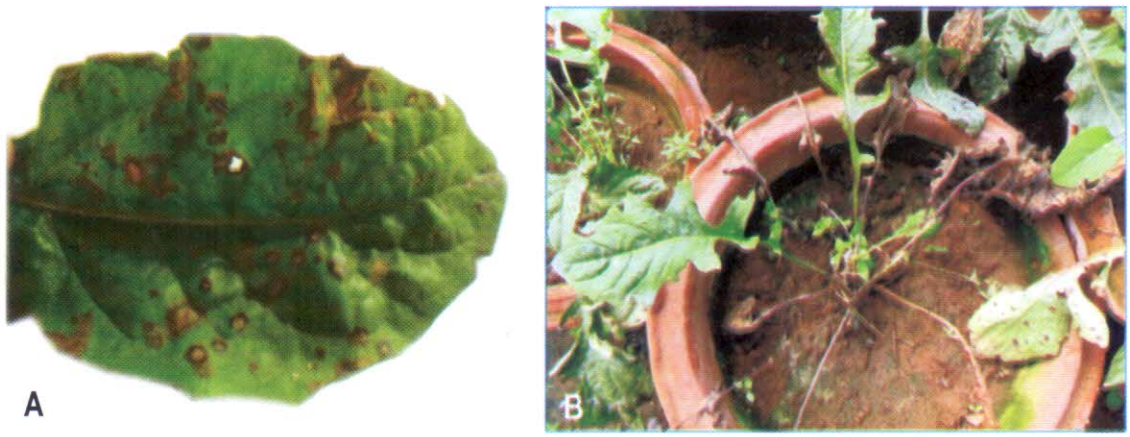

Fig. 1 : Affected plant parts of gerbera

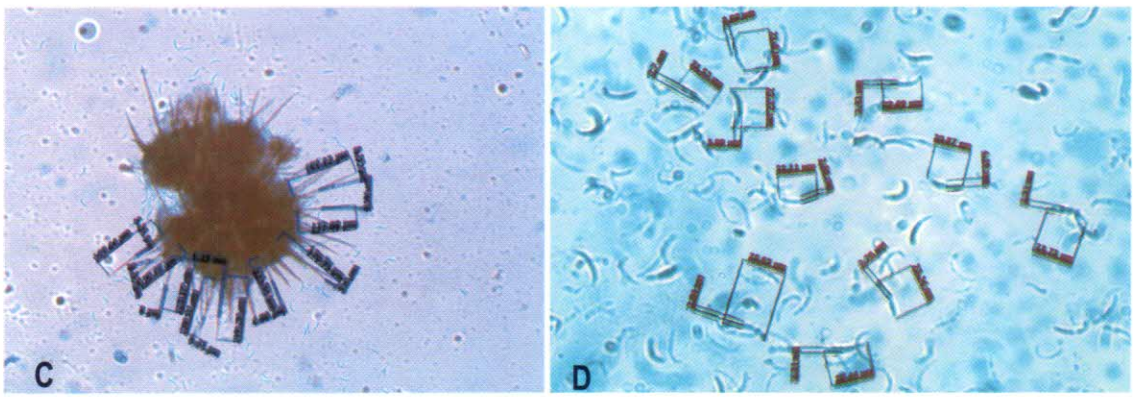

Fig. 2 : Setae and conidia of *Colletotrichum capsici*

Table 1 : Survey on incidence of fungal diseases of gerbera grown under protected condition

Location	Disease Intensity			
	Wilt	Alternaria leaf spot	Colletotrichum leaf spot	Cercospora leaf spot
Tissue Culture Laboratory, OUAT	10	21	48	52
College of Agriculture, Bhubaneswar	4	23	26	37
Tangi, Khurda	0	13	15	32
Home gardens, Bhubaneswar	2	7	13	8

microscopic examination (Fig.2). The morphological measurement studies were undertaken by several workers (Thind and Jhooty,1990 and Gautam, 2014) in several hosts including gerbera.

REFERENCES

Dubey, S.C., Singh, B.2006.Blight of tuberose caused by *Colletotrichum capsici*-a new disease.*Indian Phytopathology* Vol **59**: 128-129.

Gautam, A.K.2014. The genera *Colletotrichum*: an incitant of numerous new plant diseases in India. *Journal on New Biological Reports* **3**: 9- 21.

Ghosh, P. P., Mandal, D., Laha, S., Dasgupta, M. K.2009, Dynamics and severity model in managing fungal diseases. *The Journal of Plant Protection Sciences* **1** : 55-59.

Thind, T.S. and Jhooty, J.S.1990.Studies on variability in two *Colletotrichum species* causing anthracnose and fruit rot of chillies in Punjab. *Indian Phytopathology*. **43**:53-58.

Tomioka, K., Jouli, M., Toyozo, S.2008. Anthracnose of *Polygonatum falcatum* caused by *Colletotrichum dematium*. *Journal of General Plant Pathology*.**74**:*402-404*.

Wheeler. B.E.J., 1969.*An Introduction to Plant Diseases*. John Willey and Sons Ltd., London.301