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FIRST REPORT OF COLLAR ROT DISEASE IN *GERBERA JAMESONII* BOLUS EX HOOK CAUSED BY *SCLEROTIUM ROLFSII* SACC. IN INDIA

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ABSTRACT

The incidence of collar rot of *Gerbera jamesonii* Bolus ex Hook caused by *Sclerotium rolfsii* was recorded for the first time in Ooty (Nilgiri dist.) and Yercaud (Salem dist.), Tamil Nadu, India during 2013-2014. The symptomatology of the disease was studied in detail and the pathogen was isolated from the infected root bits of *Gerbera* using Potato Dextrose Agar medium. Pathogenicity was proven by inserting 5 sclerotia into the collar region of the host *Gerbera* (variety Bellwater white). The pathogen was studied for its phenotypic characters and finally confirmed as *Sclerotium rolfsii*.

KEYWORDS: Collar Rot, *Gerbera*, *Sclerotium*, Pathogenicity

INTRODUCTION

African daisy, *Gerbera jamesonii* Bolus ex Hook is a highly attractive cut flower crop with a huge profitable marketing and export potential in India. The incidence of collar rot of *Gerbera* (*Sclerotium rolfsii*) was recorded for the first time in Ooty (Nilgiri dist.) and Yercaud (Salem dist.), Tamil Nadu, India during 2013-2014. The climatic conditions prevailing in the areas of Tamil Nadu are most favourable for growing *Gerbera*.

MATERIALS AND METHODS

Isolation of the Pathogen

Infected crown bits were placed on potato dextrose agar medium after surface sterilizing with 0.1% mercuric chloride ($HgCl_2$) for 30 seconds and washed thrice in the series of sterile distilled water to remove the traces of mercuric chloride and transferred to sterilized Petri plates containing potato dextrose agar (PDA) medium amended with 1000 ppm of streptomycin sulphate. The Petri plates were kept in an incubator at temperature (20 ± 2°C) for 7 days and observed periodically for the growth of pure colonies. Pathogen was purified by growing on plain agar medium.

Pathogenicity Test

Pathogenicity was proven by placing 5 sclerotia on to the collar portion of *Gerbera* (var. Bellwater white) plants and was maintained in the polyhouse at 22 ± 2°C. The fungus was re-isolated from the plants expressing the typical symptoms after 7 days of inoculation to confirm pathogenicity.

Identification of the Pathogen

The pathogen was confirmed based on the study of morphology like colour & growth of the mycelia, size, shape

& colour of sclerotial bodies.

RESULTS AND DISCUSSIONS

Symptomatology of Collar Rot

The collar rot symptom was noticed both in seedling and maturity stage. Initially, the infected plants exhibited brown necrotic lesions on the petioles near collar region. Subsequently, the leaves turned water soaked to brown coloured. The affected leaves droop and resulted in death of the infected plants. The typical symptom observed was the presence of a cottony, white, dense mat of mycelial growth on the surface of the petioles and collar region and on the adjacent soil surface. These bodies turned brown and hard as they mature and formed sclerotia. During flowering stage of the crop growth (70 days after planting), leaves dried and subsequently the infection spread to other leaves and stem (flower stalk) within one week. Finally, flower dried and droops. Examination of the infected plants showed the presence of sclerotial bodies on the affected collar and crown portion. Besides, when split open the affected collar and crown region, plenty of sclerotial bodies (20-30 sclerotia) of round shaped, brown coloured are seen on and above the collar portion (Figure 1). The fungus *S. rolfsii* induced a variety of symptoms such as seed rots, seedling blight, and collar rot, stem rot, and wilt in different host plants (Arunasri *et al.,* 2011).

Figure 1: Symptomatology of Collar Rot of *Gerbera*;
a) Blightening of the Plant; b) Rottened Root and Collar Portion with Mycelia

Pathogenicity

Inoculation of 5 sclerotia of *S.rolfsii* in to the collar region of 30 days old healthy *Gerbera* variety Bellwater (White) expressed the typical symptoms within 7 days after inoculation. Infected plants showed typical rot in the collar portion with numerous brown, mustard seed like sclerotia, followed by blightening and girdling of the affected plants. The pathogen was re-isolated from the artificially inoculated plants and showed all the characteristic features of the original culture. Thus Koch's postulate was confirmed (Figure 2). Similar methodology was followed and proven pathogenicity in tomato plants by Xie *et al.* (2014).

Figure 2: Pathogenicity Test of Collar Rot Pathogen on *Gerbera* (Var. Bellwater White)

Morphological Characterization

Pathogen associated with collar rot was isolated from *Gerbera* variety Donavan (yellow). The mycelium of the fungal culture on PDA medium was white and fluffy. Small white tufts were formed on mycelium which later turned to dark brown round sclerotia and measured 1-2 mm in diameter. Based on phenotypic characters, the pathogen was confirmed as *Sclerotium rolfsii* (Figure 3). Similar observations were reported by Reddi Kumar *et al.* (2014) in Groundnut.

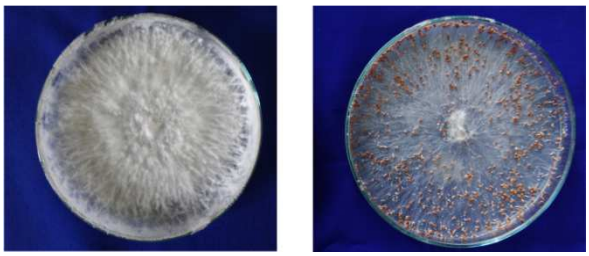

Figure 3: Culture of Collar Rot Pathogen with Sclerotial Bodies

CONCLUSIONS

The observation on the symptoms and pathogen characters confirmed the collar rot disease is caused by *Sclerotium rolfsii* and found to be the first report of the occurrence of *S. rolfsii* in *Gerbera* in Tamil Nadu, India. This occurrence might be due to the contamination carried by the soils and implements used to deal many crops in the polyhouses.

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