FIRST RECORD ON BOTRYTIS BLIGHT (BOTRYTIS GLADIOLORUM) OF GLADIOLUS FROM BANGLADESH

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ABSTRACT


Botrytis gray mold disease like symptoms appeared on gladiolus during 2012 and 2013 crop season grown in Jessore regions of Bangladesh. The disease caused spots on leaves, flower buds and inflorescence. In severe infection, the disease caused both flower and leaf blight and corm rot. Botrytis gladiolorum was consistently isolated from infected gladiolus plants. For confirmation of the disease, Kock’s postulate was performed through artificial inoculation of healthy leaves of gladiolus grown in pots in a glass house. Conidial suspension of B. gladiolorum isolated from naturally infected plants used as inocula for inoculation. Characteristic symptoms of Botrytis blight developed on inoculated gladiolus plants were identical as recorded from the field. Based on inoculation test it was confirmed that the disease was Botrytis blight of gladiolus and the causal fungus was B. gladiolorum. This is the first record on the occurrence of Botrytis blight and its causal pathogen, B. gladiolorum in Bangladesh.

Key words: Botrytis gray, Botrytis gladiolorum, incidence

INTRODUCTION

Gladiolus (Gladiolus hortulanus), also known as queen of the bulbous plants, is cultivated in Bangladesh for its beautiful flower spikes having a long life as cut flower. Its magnificent inflorescence with variety of colors and number of pretty florets makes it attractive to the growers and cut flower users (Chanda et al. 2000, Bose et al. 2003, Pant 2005). The cut flower is one of the most important commercial crops in Jessore region of Bangladesh. The requirements of cut flower in the country are supplied by the growers of these regions.

Gladiolus plant is attacked by a number of diseases throughout the world. Of them Botrytis blight caused by B. gladiolorum is very destructive one. The disease is manifested by spots on leaf, flower bud, inflorescence and stem, and corm rot. Drayton (1928) reported Botrytis disease of gladiolus from Canada in 1928. The disease has also been reported from Holland (Drayton 1929), England (Moore 1939), New York (Dodge and Laskaris 1941), Australia (Wade 1945), India (Sohi 1992, Singh et al. 2005), Pakistan (Mirza and Shakir 1991) and Iran (Mirzaei et al. 2008). Mirza and Shakir (1991) reported B. gladiolorum from corm and leaves of gladiolus in Pakistan. Sohi (1992) worked on diseases of ornamental plants and reported B. gladiolorum from corms and leaves of gladiolus in India. Blight caused by B. gladiolorum is noted as the major threat for gladiolus production in India (Singh et al. 2005).

The disease has not yet been reported from Bangladesh. In recent years, disease problems appeared in Jessore regions of Bangladesh as one of the major limiting factors for growing gladiolus. In 2013-2014 crop season, a new disease appeared in farmer’s fields of the regions. The disease was manifested by characteristic symptoms of Botrytis blight as spots on leaf, flower bud, flower and stem and rotting of corm. The disease severity was very high and caused leaf and inflorescence blight. Almost all plants in a field were found to be infected by the disease. Moreover, the market price of flower sticks was reduced. The symptoms appeared in the field was recorded and compared with the symptoms reported by other workers (Mirza and Shakir 1991, Sohi 1992, Singh et al. 2005 and Mirzaei et al. 2008). The comparison reveals that the disease may be Botrytis blight. To identify the disease an investigation was conducted during the flower season of 2013 in Jessore region of Bangladesh.

MATERIALS AND METHODS

Diseased samples of leaf, flower buds and stem of gladiolus were collected from farmers’ fields of Jessore regions. The fungus associated with the specimens was isolated following tissue planting methods on potato dextrose agar (PDA) (Mian 1995). Collected leaf specimens were cut into small pieces, sterilized with 1.0% chlorox (NaHCl) solution for 1 min, rinsed in sterile distilled water for three times and placed in Petri dishes containing PDA. The isolated fungus was purified following hyphal tip method (Mian 1995). To identify the
fungal, morphological characters such as conidiophore length, conidial and sclerotal dimensions were recorded, and the associated fungus was identified based on the morphology (Mirzaei et al. 2008).

Pathogenicity of the isolated fungus was performed under control conditions by inoculating healthy gladiolus with spore suspension of B. gladiolorum isolates. Gladiolus plants were grown in earthen pots (20 cm height and 20 cm rim diameter). The isolates were multiplied on PDA in Petri dishes. Ten days after incubation, conidia were harvested from the cultures by flooding the plates with sterilized distilled water and scraping with sterilized glass slides. The conidial suspension was filtered through muslin cloth to remove mycelium fragments. The suspension was adjusted to 6x10^4 conidia ml^-1 using sterilized distilled water. At flowering stage, apparently healthy gladiolus leaves were inoculated with the conidial suspension. For inoculation, the inoculum suspension was sprayed over the plants. Plants under control were sprayed with plain water. Both inoculated and control plants were covered with polythene sheet to keep the plants humid for 48 hours. The pots with plants were placed in a glass house having ambient temperature of 20-22°C until development of symptoms. Characteristic symptoms of the disease appeared within 12 days of inoculation. The inoculated fungus was re-isolated from the inoculated plant parts showing characteristic symptoms following the procedures as mentioned earlier. Pieces of leaf specimens were also plated on moist blotting paper in Petri dishes and incubated at 21°C. The fungus grew on the leaf samples were isolated, purified and morphological characteristics of the fungus were recorded.

RESULTS AND DISCUSSION

Symptoms of Botrytis blight of gladiolus observed on leaf, stem, flower and corm in the farmer’s fields and in inoculated plants of gladiolus are described below:

**Symptoms on leaf**
Initially, reddish brown tiny spots appeared on the leaves which became round to oval and sometimes irregular in shape (Plate 1 A). The spots enlarged gradually and turned into pale brown in color with reddish brown margin and dark yellow center (Plate 1 B). In case of severe infection, several spots coalesced together and formed large lesions and a blighted symptom appeared (Plate 1 C). At later stage of infection, moldy structure of mycelium, conidiophores and spores appeared on the blighted leaves (Plate 1 D& E). Severe lesions appeared on leaf sheath which girdled the sheath around the stem (Plate 1 F).

**Symptoms on stem**
Infection of stem started from leaf sheath (Plate 1 F). From the sheath, lesions moved downwards and reached the stem causing stem girdling. The lesion encircles the stem and soft rot symptoms appeared. Sometime stem girdling occurred at the point of infection (Plate 2 A). Grayish fungal growth also observed at the point of infection of stem (Plate II B).

**Symptoms on flower**
Minute water-soaked lesions developed on flower buds and flowers of infected plants at 72 hr after inoculation. Lesions increased in size and coalesced to form patches within 7 to 10 days of infection. Shoots became blighted and died in 12-14 days. All the infected organs were covered with gray mold within 16-18 days. Re-isolation of the causal fungus from the inoculated plants consistently yielded the inoculated fungus. On petals and sepals translucent water soaked spots appeared with light brown margin and pale colored centre (Plate III A). As the spots enlarged, dead tissue turned into brown and the flowers became rotten (Plate III B). In severe cases entire flower can be rotted and gray mass of spore appeared on rotted portion (Plate III C). Plants under control plants did not show any symptom of the disease.

**Symptoms on corms**
Initially, small reddish brown lesions appeared on corms of gladiolus (Plate IV A). Gradually, several lesions coalesced together and turned into large black lesion (Plate IV B). Sometime large black mummified areas appeared on the neck region of the corm. In the neck region, large brown spots were observed (Plate IV C).

**Morphological characteristics of the causal fungus**
After 48 hr of incubation, whitish mycelial growth appeared on the infected leaf pieces of gladiolus used as inocula and plated on moist blotting paper in Petri dish (Plate V A). Similarly, after 5 days of incubation colonies of B. gladiolorum grew from pieces of gladiolus leaf were placed on PDA in Petri dishes (Plate V B). Conidiophores bearing conidia (Plate II C) appeared on the colonies produced on leaf pieces as well as PDA (Plate V A and C). Later on, the colony turned into brown and produced black sclerotia after 14-16 days of incubation (Plate V D and E). Conidiophores were dark brown and twisted (Plate V A, B, D and E). Conidia were ellipsoid and ovoid or oval in shape, pale brown in color and 14.2-20.7 mm x 9.3-12.9 mm in dimension (Plate V F).
The symptoms of *Botrytis* blight of gladiolus recorded from inoculated as well as naturally infected plants in the present investigation are similar to the symptoms reported by other researchers (Mirzaei *et al.* 2008, Sung Kee Hong *et al.* 2003, Pscheidt and Ocamb 2013). The morphological characteristics of colonies, mycelia, conidiophores, conidia and sclerotia of *B. gladiolorum* recorded in the present investigation are almost similar to the descriptions of Ellis, (1971), Wang *et al.* (1996), Kishi 1998, Sung Kee Hong *et al.* (2003) and Mirzaei *et al.* (2008).

Findings of the present investigation clearly reveal that *Botrytis* blight caused by *B. gladiolorum* regularly attacks the gladiolus plants in Jessore regions of Bangladesh. However, the disease has not yet been reported from the country. So, the present report may be considered as the new record of *Botrytis* blight of gladiolus and its causal fungus, *B. gladiolorum* in Bangladesh.

Plate IV. Photographs showing corm symptoms of *Botrytis* blight (*B. gladiolorum*) of gladiolus [A. spots on flower bud, B. blighted flower having mycelium, conidiophores and conidia, C. large brown spot on neck region].

Plate 5. Photographs showing corm symptoms of *Botrytis* blight (*B. gladiolorum*) of gladiolus [A. mycelium grew on leaves placed on moist blotter, B. mycelium grew on leaves placed on PDA, D and E. sclerotia formation, C & F. conidiophores bearing conidia, F. Conidia].

**LITERATURE CITED**


