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First report of anthracnose disease of *Aloe vera* caused by *Colletotrichum gloeosporioides*

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ABSTRACT:

A new disease of *Aloe vera* was found in Madhya Pradesh, India having reddish brown to brown colour lesions on leaf surface. The disease was found to be caused by a fungus. The fungus was exclusively isolated from the disease spots, and typical symptoms were reproduced after inoculation with the isolate. The causal fungus was identified as *Colletotrichum gloeosporioides* Penz. & Sacc.

Keywords:
Aloe vera, Anthracnose, *Colletotrichum gloeosporioides.*

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INTRODUCTION

Aloe barbadensis (L.) Burm. Fil. popularly known as *Aloe vera*, is a perennial, drought resistance, succulent medicinal herb belongs to the family 'Aloeaceae' (Barcroft and Myskja, 2003). It has a long, fleshy sword- shaped leaves, with sharp points arranged in a rosette pattern. *Aloe vera* is believed to have originated in African continent specifically in Egypt (Daudu, 2000).The central bulk of the leaf contains colourless mucilaginous pulp (*A. vera* gel), made up of large, thin walled mesophyll cells. The plant contains 95 – 96% water and over 75 other constituents which include vitamins, minerals, enzymes, sugars, phenolic compounds, saponins and amino acids (Boudreau and Beland, 2006). It is highly appreciated due to its short growth period and highly economic value. In India the plant is mainly cultivated in Rajasthan, Andhra Pradesh, Gujarat, Madhya Pradesh and Maharashtra. Total production of *A. vera* in India has been estimated to be 1, 00,000 tonnes (Dubey and Pandey, 2009). It is used for its laxative, anti-inflammatory, immunostimulant and antiseptic effect (Capasso et al, 1998). It is very much effective for the treatment of sore and wounds, skin diseases, reduce blood sugar in diabetes, arthritic swelling, constipation and pile (Rajendran et al, 2007).

Occurrence and symptoms

During the survey of various nurseries of Gwalior city, India, a typical anthracnose symptom on the leaf surface of *A. vera* was observed in August, 2010. The symptoms of anthracnose were began as a small round to oval, water-soaked dark green area about 1-2 mm in diameter. These area increase into circular spots with tan to light brown centre bordered by water soaked tissue. As these spots expand, centre of the lesion become reddish brown to brown color. The average diameter of the spots was 3-30 mm and the size of the necrotic areas increases as spots coalesce (**Figure 1A & B**). The acervuli on infected leaves produced black coloured spore mass under high humid condition (**Figure1C**). In the advance stage of infection, spots appeared on both the surfaces of leaf, affected area lost the mucilaginous gel and leads the death of infected leaves.

Isolation and Identification of the fungus

Isolation of the pathogen was done by collecting diseased plant samples from various nurseries. Leaves showing the typical symptoms were thoroughly washed in tap water and cut into small pieces. These pieces were surface sterilized with 1% sodium hypochlorite (NaOCl) for 2 min and washed 3-4 times in sterile distilled water. The surface sterilized leaf pieces were then aseptically transferred to petriplates containing Potato Dextrose Agar media. Plates were incubated at 25±2º for 4 to 5 days and the isolate was purified by single spore isolation and maintained on PDA medium to keep the cultures viable.

The fungal colony appeared on inoculated tissue were white to grey with puffy mycelium and dark orange colour, surrounded by white zone on the reverse side (**Figure 1D**). Acervuli were formed after15-20 days of inoculation. Conidiophores were simple, short and erect. The conidia were hyaline, one celled, ovoid to oblong and dumbbell shaped. The size of conidia varied from 12.5-18×3-5 µm (**Fig.1F**). Setae were 1 -4 septate, brown and ranged in size from 42- 150 × 4-5 µm (**Figure1E**). Based on the symptoms, mycelia and conidial characters, the fungus was identified as *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc., which was further confirmed at Indian Agricultural Research Institute, New Delhi (#ITCC- 7800.10).

Pathogenicity of the fungus

Pathogenicity of the fungus was carried out by pin prick method on detached leaves. Small 5-6 month old plants of *Aloe vera* were planted in pots filled with fertilized soil and cultivated for 6-8 weeks in a glasshouse. Healthy leaves were selected and a suspension (10^5 conidia/ml) of 7-8 days old culture of *C. gloeosporioides* was sprayed onto pinpricked leaves in petridishes lined with moist sterile blotting paper. Detached pinpricked leaves sprayed with sterile distilled water were served as control. The petridishes were incubated at 25±2ºC for 6-7 days under laboratory conditions. The pathogen was appeared on the inoculated leaves and the fungus was consistently re-isolated from infected leaf onto Potato Dextrose Agar media. No symptoms were observed in control leaves.

Colletotrichum gloeosporioides has previously been reported as an anthracnose pathogen of olives (*Olea europaea*) in Australia (Sergeeva et al, 2008), on onion (*Allium cepa*) in Benin (Sikirou et al, 2011) and in Kokum (*Garcinia indicia*) (Jadhav et al, 2009) and clove (*Syzygium aromaticum*) (Jadhav et al, 2008) from India. To the best of our knowledge; this is the first report of anthracnose disease of *Aloe vera* in India.

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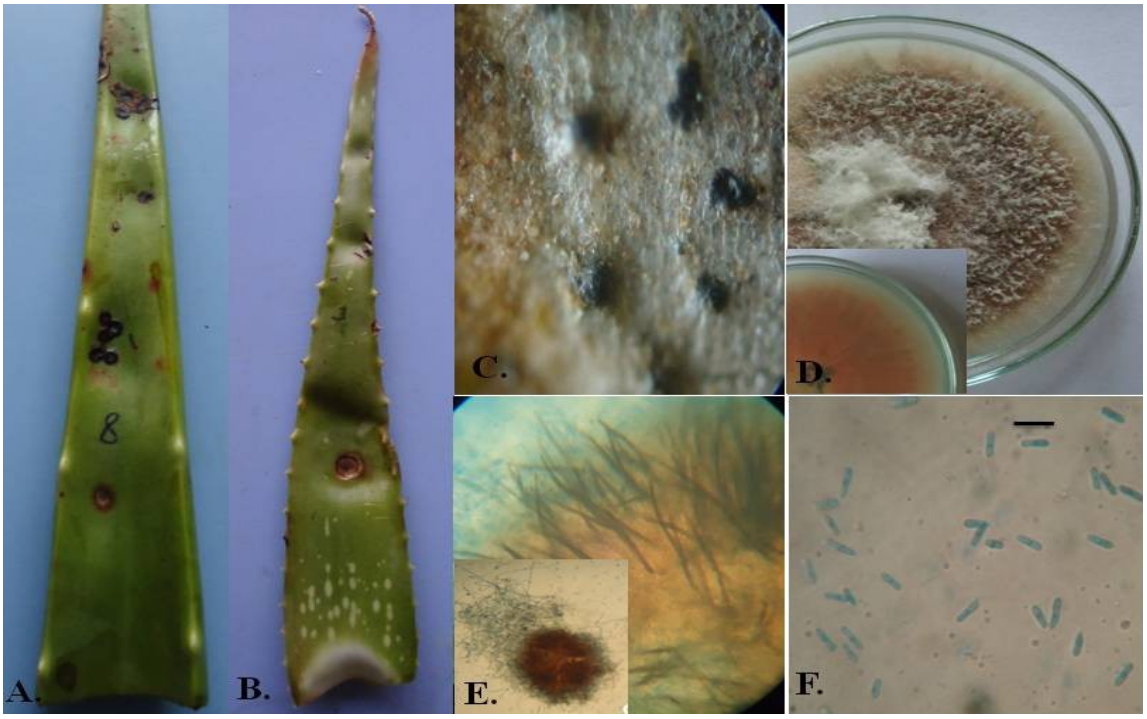

Fig.1. (A): Leaf showing initiation of anthracnose and coalesce symptom (B) Typical anthracnose symptom (C) Acervuli of *C. gloeosporioides* on leaf (D) Seven-day old Culture of *C. gloeosporioides* (E) Acervuli with dark brown setae (F) Conidia of *C. gloeosporioides.*

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REFERENCES

Sikirou R, Beed F, Hotègni F, Winter S, Assogba -Komlan F, Reeder R Miller SA. 2011. First report of anthracnose caused by *Colletotrichum gloeosporioides* on onion (*Allium cepa*) in Benin. *New Dis. Reports* 23:7.

Sergeeva V, Spooner-Hart R, Nair NG. 2008. *Colletotrichum acutatum* and *C. gloeosporioides* causing leaf spots of olives (Olea europaea) in Australia. *Aus. Pl. Dis. Notes* 3:143-144.

Jadhav SK, Diwakar MP, Sawant UK, Kadam JJ. 2008. Management of leaf spot disease of Kokum *(Garcinia indica)* incited by *Colletotrichum gloeosporioides* Penz. *J. Pl. Dis. Sc.,* 3.

Jadhav SN, Gadre UA, Kadam JJ, Joshi MS, Sawant UK. 2009. *In vitro* evaluation of bioagents against *Colletotrichum gloeosporioides* Penz. causing leaf spot of clove. *J. Pl. Dis. Sc.* 4:104-106.

Baracroft A, Myskja A. 2003. *Aloe vera* nature's silent healer. BAAM Pub. Ltd. 28-45.

Daodu T. 2000. *Aloe vera*, the miracle healing plant. Health feild Corporation, Lagos, 36.

Boudreau MD, Beland FA. 2006. An evaluation of the biological and toxicological properties of *Aloe barbadensis* (Miller). *J. Environ. Sci. Health* 24:103-154.

Capasso F, Borrelli F, Capasso R, Di Carlo G, Izzo AA, Pinto L, Mascolo N, Castaldo S, Longo, R. 1998. Aloe and its therapeutic use. *Phytother. Res.,* 12:S124.

Dubey R, Pandey AK. 2009. A new report on collar and root rot disease of *Aloe vera* caused by *Sclerotium rolfsii*. *J. Mycol. Pl. Pathol.,* 39:300-301.

Rajendran A, Narayanan V, Gnanavel I. 2007. Sepration and Characterization of the Phenolic Anthraquinones from *Aloe vera*. *J. App. Sci. Res*., 3:1407-1415.