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Report on Fungi Associated with Symptomatic Leaves and Fruits of White Brinjal (*Solanum melongena* L. var. *alba*)

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Abstract

Three types of symptom were recorded on leaves of white brinjal (*Solanum melongena* L. var. *alba*). The symptoms were angular leaf spot, powdery mildew and fruit rot. Three different fungi were associated with the symptomatic leaves and fruits of the plant. The fungi *Pseudocercospora* sp. and *Oidium* sp. were associated with angular leaf spot and powdery mildew symptoms and *Alternaria alternata* was associated with fruit rot symptom.

Keywords: Symptomatic leaves and fruits, associated fungi, white brinjal, *Solanum melongena* var. *alba*

INTRODUCTION

The eggplant or brinjal (*Solanum melongena* L.) is a plant of the family Solanaceae. It is also known as nightshade. The plant is closely related to the tomato and potato. It is native to India. Owing to its versatile nature and wide use in both everyday and festival Indian food, it is often described as "King of vegetables". It has considerable nutritive values. Fruits contain thiamine (vit B_1 0.39 mg), riboflavin (vit B_2 0.37 mg), vitamin C (2.2 mg), calcium (9 mg) and iron (0.24 mg) per 100 gm. Brinjal is effective in the treatment of free radicals and is also a source of folic acid (Anonymous, 2014).

The phylloplane, the surface of plant leaves is a complex terrestrial habitat that is characterized by a variety of microorganisms including bacteria, filamentous fungi and yeast. Phylloplane fungi are the mycota growing or the surface of leaves. There are two groups of phylloplane fungi: residents and casuals. Residents can multiply on the surface of healthy leaves without noticeably affecting the host. Whereas, casuals land on the leaf surface but cannot grow. Phylloplane fungi have been poorly studied as compared to endophytes, saprobes and pathogenic fungi (Prabakaran *et al.*, 2011).

Common fungal diseases of brinjal plants are anthracnose, early blight, grey mold, late blight, phytophthora blight, septoria leaf spot, verticillium wilt, fusarium wilt and white mold (Mohit and Shukla 1986). In Bangladesh, research has been done on fungal diseases of common varieties of brinjals (Bashak *et al.*, 1989). This is the first report of association of the fungi with white brinjal (*Solanum melongena* var. *alba*) variety from Bangladesh. Present study was undertaken (i) to find out the association of fungi with diseased leaves of the plant, (ii) to characterize and identify of the associated fungi and (iii) to notice the interaction of the fungi on phylloplane of the plant.

MATERIAL AND METHODS

Diseased leaf and fruit samples were collected from the Botanical Garden, Curzon Hall Campus, University of Dhaka, Bangladesh during the period of October 2009 to December 2010. Three types of symptoms were recorded

on brinjals and that were angular leaf spot, powdery mildew and fruit rot. A total of twelve samples were examined from each type of symptom. Infected leaves and fruit samples were cut into small pieces and placed on warm water in specimen cup for 10 minutes. Then fungal structures were scraped off with sterilized scalpel and placed on a clean slide with lectophenol and cotton blue. Fungal structures were spread with two needles and after placing cover glass it was examined under microscope.

Identification of the associated fungi was done following the standard literatures (Ellis 1971& 1976; Barnett and Hunter, 1972). Voucher specimens were preserved in the Herbarium, Mycology and Plant Pathology division, Department of Botany, University of Dhaka, Bangladesh.

RESULTS AND DISCUSSION

During the 3rd week of October, leaves of brinjal were attacked by *Pseudocercospora* sp. showing indistinct reddish brown irregular spots. Numerous spots covered the entire leaves. From last week of November, *Oidium* sp. started to colonize around the spots and within 7 days it destroyed the conidiophores and conidia of the fungus. Infected leaves became yellowish, dried and dropped earlier. Later, the infected plants completely died. At the middle of December, fresh leaves were infected by *Oidium* sp. showing white powdery mildew symptom.

In the present study three types of disease symptoms were recorded on brinjal:

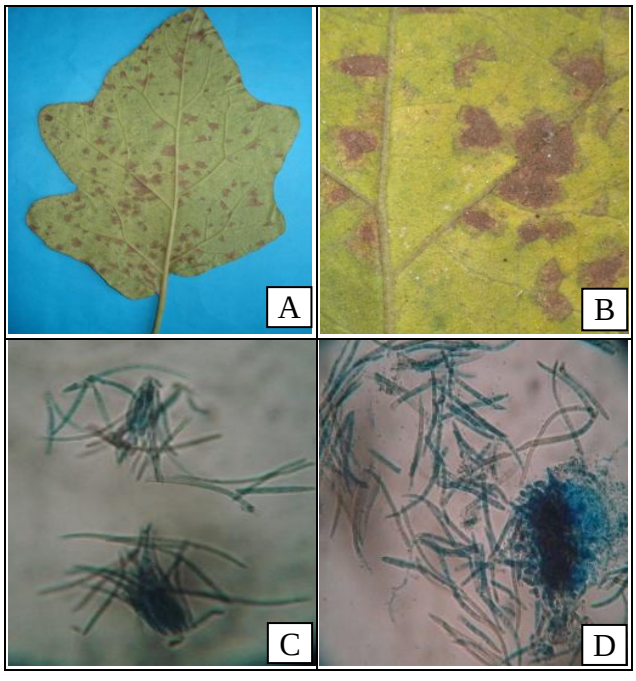

Plate 1. *Solanum melongena* L. var. *alba*: A. Leaf with angular spot, B. enlarged view of spots, C-D. *Pseudocercospora* sp. (Bar = 50 µm).

1. Angular leaf spot: Infected leaves showed angular brown spots that appear especially on the lower surfaces of the leaves. Numerous scattered areas of the tissues around the veins become yellowish to brownish and eventually dried out. The fungus causes pink boll rot. Causal organism: *Pseudocercospora* sp. (Plate 1).

The genus *Pseudoercospora* is a hyphomycetous fungus comprised of many plant-pathogenic species. They produce leaf spot diseases on a wide range of agriculturally important plants. These diseases are major problems for large-scale growers and backyard gardeners (Anonymous, 2010).

2. Powdery mildew: Infected leaves showed white powdery sub circular patches of fungal colony on dorsal surface of leaves. In advance of fungal growth the leaves gradually dried and entire plant severely affected and died. Causal organism: *Oidium* sp. (Plate 2).

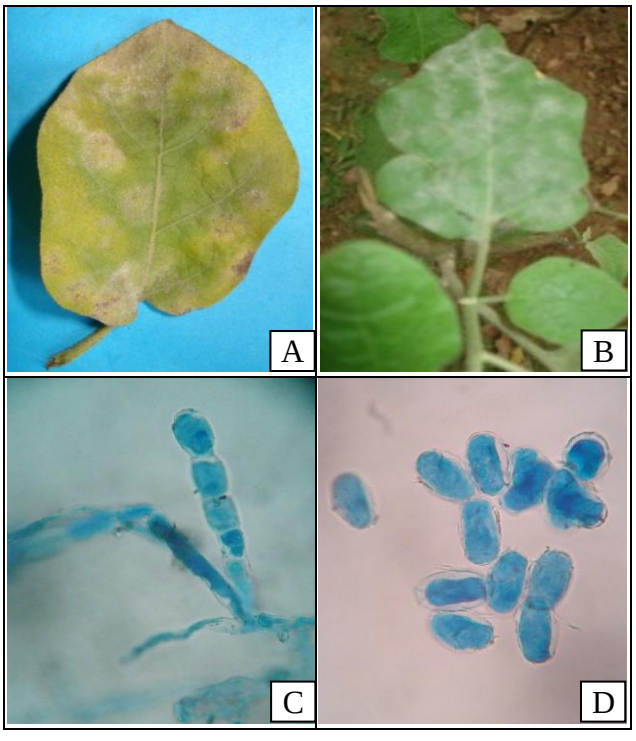

Plate 2. *Solanum melongena* var. *alba*; A. Powdery mildew fungus suppressing leaf spotting fungus *Pseudocercospora* sp., B. Fresh infection of powdery mildew fungus on leaf, C. *Oidium* sp., D. Oidiospore. (Bar = 50 µm).

Oidium is a genus of Deuteromycetes, where traditionally most anamorphs of the order Erysiphales are included. Most of them are plant pathogens causing different forms of powdery mildew (Wikipedia, 2014).

3. Fruit rot: On the white fruit, the fungus produced brown lesion which caused the death of the tissues. Small brown to black lesions were became conspicuous and the entire boll eventually became blackened and dried. Causal organism: *Alternaria alternata* (Plate 3).

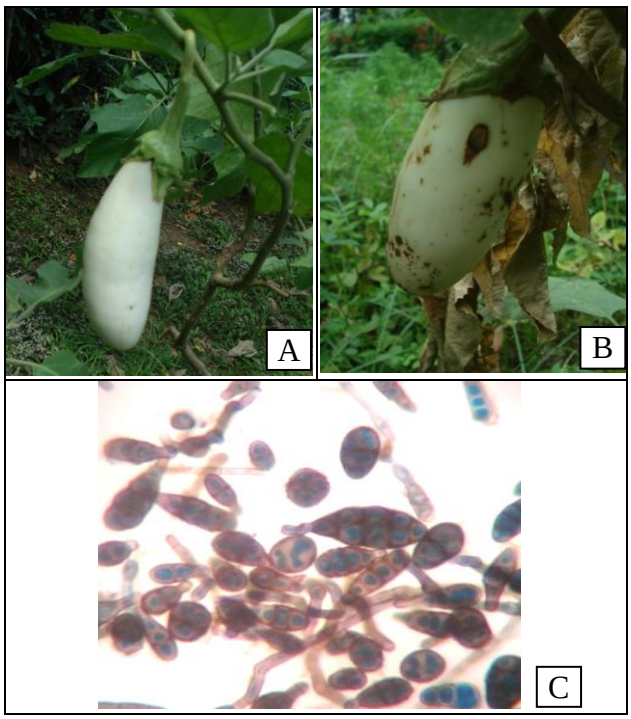

Plate 3. *Solanum melongena* var. *alba* : A. Fresh fruit, B. Infected fruit. C. *Alternaria alterneta*. (Bar = 50 µm).

Fruit rot can occur when temperatures are cool to warm, free moisture is present, and humidity is high. Fruit rot pathogens have varied life cycles, but generally survive between fruit in and on crop debris and as pathogens on weeds and other crops, as a saprophyte on decaying organic matter in soil, in the soil as dormant resting structures (Wikipedia, 2014).

Shamsi and Naher (2010) reported hyperparasites fungus *Tuberculina persicina* as biocontrol agents of rust fungus in Bangladesh. They also reported the interaction of phylloplane mycoflora on *Vigna sinensis* L. (Shamsi and Naher, 2010). Their observation showed that the growth of bean rust fungi *Uromyces appendiculatus* (Pers. ex Pers.) was controlled by powdery mildew fungus *Oidium* sp. Shamsi *et al*. (2012) also reported phylloplane fungi and their interaction on *Datura metel* L. and *Vigna catjang*.

Present study revealed that the powdery mildew fungus *Oidium* sp. is capable of controlling leaf spot fungus *Pseudocercosopa* sp. This study is an excellent example of interaction among the fungi in nature. In addition, this investigation also indicated that the presence of *Trichoderma viride* and *Trichotheceum roseum* along with *Oidium* spp. are also playing significant role in nature as biocontrol agents.

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