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Short Communication

Sclerotinia rot of brinjal and its host range in West Bengal

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In India, brinjal is the 4th most important vegetable grown after potato, onion and tomato. According to an estimate about 1.4 million small and marginal farmers in India grow brinjal crop, which provide regular and steady income to them (2). West Bengal has the lion share in brinjal production (29.1%) in India, occupying the highest in acreage and production of brinjal among the states. A major group of farmers are involved in brinjal cultivation for their income generation throughout West Bengal. Presently cultivated area of brinjal in West Bengal is 158.44 thousand ha with a production and productivity of 2870.60 thousand tones and 18.11 ton/ha (Economic Review, 2010-11, Govt. of West Bengal). Wilting or death of brinjal plant is the major constraint in brinjal cultivation. The diseases that cause wilting or death of the plant are bacterial wilt caused by *Ralstonia solanacearum* (1), foot rot by *Rhizoctonia solani*, *Sclerotium rolfsii* (4) and *Sclerotinia sclerotiorum* (3). But no information is available regarding sclerotinia rot of brinjal in West Bengal. The present investigation aimed at recording incidence of sclerotinia rot of brinjal with detail symptoms in different districts of West Bengal and studying host range of this pathogen.

Survey was carried out in different districts of West Bengal for incidence of sclerotinia rot of brinjal and to record symptoms of the disease. The pathogen was isolated in chloramphenicol amended potato dextrose agar medium (PDA) in Petridish by transferring sclerotia and white mycelium from the diseased plants. After production of sclerotia on medium, the culture was transferred to fresh medium for maintenance and future works. Pathogenicity test was done by placing a small mycelial strip (1 cm length and 1mm deep) from four day-old culture into the incision of actively growing branch of brinjal plant. The mycelial strip was then wrapped with thin layer of moist cotton, water was spread over the entire plant and the inoculated branch was covered with polythene packet to maintain moist condition for three days. After three days, polythene cover was removed; observation was taken for development of symptoms, if any. The pathogenicity test was done in the month of January and further reisolation of the pathogen from artificially inoculated brinjal plants was made from diseased tissue. For host range study, inoculum was produced by inoculating the pathogen on healthy french bean fruits in the laboratory. A mycelium strip

was placed in between a bunch of ten fruits and the fruits were tied with cotton thread. The bunch of fruit was kept inside a wet polythene bag and incubated in room temperature, within 5-6 days, fruits were infected and white mycelial growth. These fruits were used as source of inoculum of *S. sclerotiorum*. Plants were collected from field and water was spayed before inoculation. Three infected bean fruits were tied with cotton thread on the stem, branch or fruit. In case of cabbage and cauliflower, infected bean fruits were placed at the base of petiole in between two leaves. Inoculated plant materials were kept within wet polythene bag and observation was taken on development of disease. Sclerotinia rot of brinjal was recorded in the districts of Nadia, North 24-Parganas, Murshidabad, Coochbehar, Jalpaiguri, Dakhin Dinajpur, Birbhum, Hooghly, Purulia of West Bengal, India. Incidence of the disease was noted during the month of December to February in different varieties of brinjal.

Symptoms of the disease

The infection occurred on the stem, branches, leaves and fruits. Primary symptom generally appeared on main stem very close to the soil surface (Fig. 1, 2). Water soaked lesion appeared on the stem which gradually increase in length and reached to the base of one or more branches (Fig. 3). White cottony mycelial growth covered the major portion of the infected area. Sclerotia developed on the mycelial growth, sclerotia were white in at the initial stage (Fig. 2), later became more or less black in colour. In the mean time, infection girdle the stem, plant wilted and died. In some plants, instead of stem infection, symptom appeared on the branches (Fig.4, 5) and leaves of those branches (Fig. 6). On the branch and leaves white mycelial growth covered the lesion embedded with sclerotia (Fig. 4, 6). Presence of prominent white mycelial growth depended on high humidity or presence of free moisture due to dew deposition or fog. Branch infection resulted partial wilting of the plant. Occasionally, the host exhibited dry lesions on the stalk, stem or branches with a well-defined border between healthy and diseased tissues. On opening dry portion of the stem, pith was full of fungal sclerotia (Fig.7) - medium to large in size, elongated or cylindrical and often attached to each other end to end. Fruits are infected directly from the soil surface or through the peduncle rot quickly (Fig.8). In advanced stages, white, cottony mycelium blankets covered the affected tissue, and sclerotia form on the surface of the fruit.

The pathogen

Sclerotia germinated myceliogenically on PDA medium and in pure culture white mycelium with hyaline, branched and septate hyphae was developed. Black sclerotia elliptical, near spherical to irregular in shape generally formed within 4 days of incubation at 25^0C.

The sclerotia were silvery white in the initial stages of development but turned dark with increasing age of the culture (Fig. 9). The cultural characteristics were in conformity with the description of the large sclerotial forms of the fungus by Purdy (6, 7).

Host range of the pathogen (Sclerotinia sclerotiorum)

Fourteen plants were inoculated in the laboratory and all the plants were infected (Table 1) showing rotting symptom with white mycelial growth. Visible symptom appeared 2-5 days after inoculation. Bottle gourd, cabbage, cauliflower, carrot, french bean, pea, mustard and parthenium showed highly susceptible reaction. This result indicates brinjal isolate of *S. sclerotiorum* is not host specific. Kumar *et al*. (5) observed similar result in a study on host range of *S. sclerotiorum* of broccoli, an isolate of *S. sclerotiorum* from broccoli infected 21 plants on artificial inoculation with mycelial suspension. Such infection potential increased survival potential of the pathogen. Incidence of Sclerotinia rot in crop field was recorded earlier in some other states of India (8). Pointed gourd believed to be new addition to the host range of *S. sclerotiorum*.

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Fig. 1. Sclerotium rot of brinjal: 1-8 different developmental stages, and 9- growth of *Sclerotinia sclerotiorum*

Table 1.
Host range of *Sclerotinia sclerotiorum* isolated from brinjal

Common name	Scientific name	Inoculated on	Symptom appeared DAI	Severity of the disease
Brinjal	*Solanum melongena*	Branch	3	++
		Fruit	2	++
Tomato	*Lycopersicon esculentum*	Branch	5	+
Chilli	*Capsicum annuum*	Stem	3	+
Bottle gourd	*Lagenaria siceraria*	Vine, stem	3	+++
Cucumber	*Cucumis sativus*	Vine	2	++
Pointed gourd	*Trichosanthes dioica*	Vine	3	++
Cabbage	*Brassica oleracea* var. *capitata*	Whole plant	2	+++
Cauliflower	*Brassica oleracea* var. *botrytis*	Whole plant	4	+++
Carrot	*Daucus carota*	Root	2	+++
French bean	*Phaseolus vulgaris*	Stem, fruit	2	+++
Dolichos bean	*Dolichos lablab*	Vine	2	++
Pea	*Pisum sativum*	Stem	2	+++
Mustard	*Brassica juncea*	Stem	2	+++
Onion	*Allium cepa*	Whole plant	3	++
Parthenium	*Parthenium hysterophorus*	Stem	2	+++

*DAI = Days after incubation, + Indicated extent of rotting and susceptibility of the host