

## Gray Leaf Spot of Tomato Caused by *Stemphylium solani*

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Gray leaf spot of tomato was observed on tomato plants growing in a middle of a pepper field where pepper plants were badly infected with gray leaf spot. Both *Stemphylium solani* and *S. lycopersici* were isolated from the lesions. Both species were highly pathogenic on tomato and pepper. This is the first report in Korea of occurrence of gray leaf spot of tomato caused by *Stemphylium solani* Weber.

**Keywords:** *Lycopersicon esculentum*, *Capsicum annuum*, *Stemphylium lycopersici*.

Gray leaf spot was observed on a few tomato plants growing in a pepper field in Cheongsong, Kyungpook province in 1997. Pepper plants around the tomato plants were severely infected with gray leaf spot. Symptoms were irregular, gray necrotic spots scattered on leaves with a yellowish halo (Fig. 1A).

Spores were observed on both abaxial and adaxial sides of the lesion when observed under a dissecting microscope. Both *Stemphylium solani* Weber (Ellis and Gibson, 1975a) and *S. lycopersici* (Enjoji) Yamamoto (Ellis and Gibson, 1975b) were found, depending on the lesions. Single spore isolates of the causal fungi were obtained by blotting the sporulating lesion against the water agar surface and transferring single spores to V-8 juice agar plates under the dissecting microscope. The V-8 juice agar plates were cultured at room temperature ranging from 15 to 27°C under 12-hr fluorescent light illumination. The pure cultures readily and abundantly sporulated with growth. Mycelial colony color was gray in general but fresh colonies with spores were gray with a light green shade.

The species we are reporting here is *S. solani* Weber of the two very close species of *Stemphylium*, since occurrence of gray leaf spot caused by *S. lycopersici* (Enjoji) Yamamoto was already reported by Min et al. (1995). Mycelia of *S. solani* were hyaline and septate. Conidiophores arose erectly from vegetative mycelia, grew upward in a lightly twisting mode and were light brown with 6-9

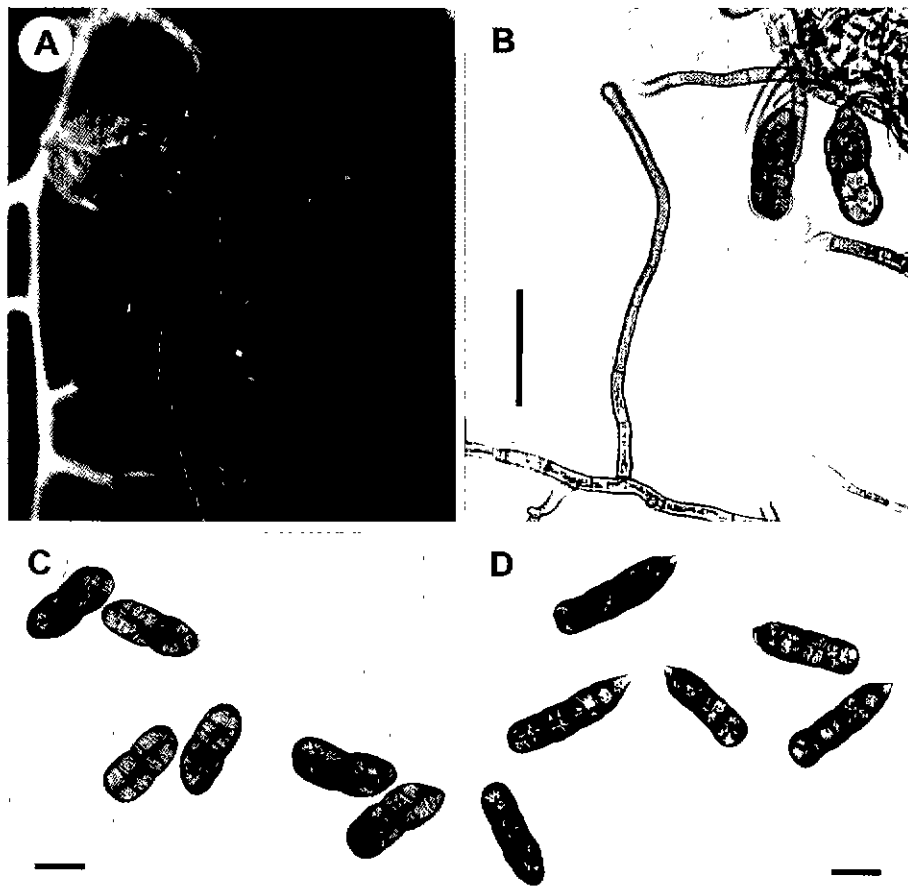
septa, sometimes branched, often proliferated from the vesicular tip with age (Table 1, Fig. 1B). Dimensions of the fresh initial conidiophores about 3 days after seeding on V-8 juice agar plates were 84-190 × 3.9-6.5 μm in range, 150.1 × 4.6 μm in average (Fig. 1B). Vesicular swelling was 7.9 μm in diameter. Conidia were formed at the terminal vesicular tip of the conidiophores. Conidia were light brown to brown depending on the age (Table 1, Fig. 1C). Conidia often germinated *in situ* forming secondary conidia. Usually 4-6 transverse septa and 1 to 3 longitudinal septa were observed. Constriction at the median septum was conspicuous. Apical end was tapering asymmetrically to form bluntly pointed apex and basal end was round. Dimensions were 30.1-51.6 × 15.0-21.5 μm in range with an average of 43.2 × 18.2 μm, and the l/b ratio was 2.37. These characteristics conformed to *Stemphylium solani* Weber (Weber, 1930, Ellis and Gibson, 1975a) (Table 1). Conidia of *S. solani* were distinguishable from those of *S. lycopersici*, which were longer and slenderer with more symmetrically tapering and more pointed apex (Fig. 1D).

Pathogenicity of the pure culture was tested by spraying a spore suspension of 5 × 10<sup>4</sup> spores per ml on the leaves of tomato and pepper seedlings. *S. lycopersici* was also tested in the same way and at the same time for comparison. Two one-month old pepper and tomato seedlings were used in inoculation of each species of *Stemphylium*. Sterile distilled water was sprayed on the plants for control. The inoculated plants were put in humidity chambers made of plastic boxes and incubated in an incubator set at 20°C at day and 15°C at night for 48 hr, then left on greenhouse benches. Numerous spots began to appear within 3 days after inoculation. Gray, round or irregular spots, limited to 1-2 mm in diameter, appeared and enlarged a little with a yellowish halo with time on both tomato and pepper, eventually causing defoliation. The symptoms were very similar to the symptoms observed in the natural field condition. *S. lycopersici* was also pathogenic on tomato and pepper. Symptoms induced by *S. solani* and those induced by *S. lycopersici* were indistinguishable from each other. Control plants remained disease free.

Gray leaf spot of tomato caused by *S. solani* and *S. lycopersici* was first reported by Weber in 1930 and by Hannon

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**Fig. 1.** A; Gray leaf spots on a tomato leaf, B; A conidiophore arising from basal mycelium, Bar=50 µm, C; conidia of *Stemphylium solani* Weber. Bar=20 µm. D; conidia of *Stemphylium lycopersici* (Enjoji) Yamamoto isolated from different lesions on the same plant. Bar=20 µm

**Table 1.** Comparison of Cheongsong isolate with original description of *Stemphylium solani*

Character	Weber (1930), Ellis & Gibson (1975)	Cheongsong isolate
Colony	Gray	Gray
Mycelia	Branched, septate	Hyaline, branched, septate
Conidiophores	Dark, septate, rigid, with swollen tips and irregularly shaped bases 130-200 × 4-7 µm, 4-7 µm thick	Tan to brown, with 6-9 septa, with swollen tips of 7.7-8.6 µm in diameter 84-190 × 3.9-6.5 µm, average 150.1 × 4.6 µm
Conidia	Oblong, pointed at the apex, rounded at the base, with 3-6 transverse and several longitudinal septa, mostly constricted at the median septum only, pale to mild golden brown, 45-50 × 20-23 µm with average 48.08 × 22.43 µm [l/b ratio 2:1]	Oblong with median constriction, apical side tapering in asymmetrical rate to form bluntly pointed apex, basal end round, with 4-6 transverse and 1-3 longitudinal septa, golden brown, 30.1-51.6 × 15.0-21.5 µm with average 43.2 × 18.2 µm
Pathogenicity	Pathogenic on tomato and pepper	Pathogenic on tomato and pepper

and Weber in 1955, respectively, in the U. S. A. Occurrence of leaf spot caused by *S. lycopersici* in Korea was reported by Min et al. in 1995. We are reporting here the occurrence of gray leaf spot of tomatoes caused by *S. solani* Weber in a natural field in Korea.

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