

Stem Rot of Tatarian Aster (*Aster tataricus*) Caused by *Sclerotium rolfsii* in Korea

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In July 2001, a destructive stem rot of tatarian aster (*Aster tataricus*) was occurred sporadically in exhibition farm of Gyeongsangnam-do Agricultural Research and Extension Services, in Hamyang, Korea. The fungus also caused collar and crown rot and systemic wilt or blight of whole plant. White mycelium spread over stems and petioles of infected plants and sclerotia formed on the old lesions and near the soil surface. The fungus showed maximum mycelial growth was obtained around 30°C but did not grow below 5°C or above 45°C. The mycelial width ranges 4.2~10.4 µm, and the color is white, usually many narrow mycelial stand grow in the aerial mycelium and formed clamp connection. Numerous sclerotia were formed in artificial media like PDA at 30°C. The shape of sclerotia were sphere and 1.0~3.2 µm in diameter. The fungus was isolated repeatedly from the infected tissues and confirmed its pathogenicity to aster and identified as *Sclerotium rolfsii*. This is the first report that *Sclerotium rolfsii* causes stem rot of tatarian aster in Korea.

KEYWORDS: *Sclerotium rolfsii*, Stem rot, Tatarian aster

Sclerotial diseases caused by sclerotium occur primarily in warm climates. The pathogens of sclerotial diseases cause damping-off of seedlings, stem canker, crown blight and rot of root, crown, bulb, tuber and fruit. Sclerotial diseases frequently cause severe losses of fleshy fruits and vegetables during transport and storage (Agrios, 1997). This kind of disease is often called sclerotinia rot in general. Several papers has been reported that sclerotia rot disease on tatarian aster was caused by *Sclerotium rolfsii* (Farr *et al.*, 1995; Gobayashi *et al.*, 1992; Mordue, 1972). Mordue (1972) suggested that *S. rolfsii* is synonym of sclerotial state from *Corticium rolfsii*. However, sclerotial stem rot of tatarian aster has not been reported in Korea (The Korean Society of Plant Pathology, 1998).

In July 2001, a destructive stem rot were occurred on tatarian aster (*Aster tataricus*) and the disease was sporadically found in exhibition farm of Gyeongsangnam-do Agricultural Research and Extension Services in Hamyang, Korea. When the canopy of the plants become densely covered, sclerotia stem rot was started to occur. The high temperature and frequent rain predisposed tatarian aster to sclerotium stem rot disease. One of the field in Hamyang, Gyeongnam province, infected areas reached to 16.3 percent. In infected plant, the fungal hyphae grew upward on surface of stems, covered the lesion with a cottony, white mass of mycelium. The white mycelium were inside and outside of infected stems, and spread on the soil surface around infected plants which is considered as the major source of further infection. The fungus grew into the cortex of stem and slowly or quickly girdles the plants, and then eventually killed the plants (Fig. 2A, B).

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Small and spherical sclerotinia were produced on the surface of lesions. They were white at first but became dark brown after maturity and their size were almost uniform. The causal fungus was easily isolated on water agar (WA) and readily grew on potato dextrose agar (PDA). The temperature for mycelial growth of the fungus on PDA ranged 10~40°C, and the optimum temperature was 30°C (Fig. 1).

The fungus grew very rapidly on PDA, the white mycelium usually formed many narrow mycelial strands in the aerial mycelium which were measured 4.2~10.4 µm in

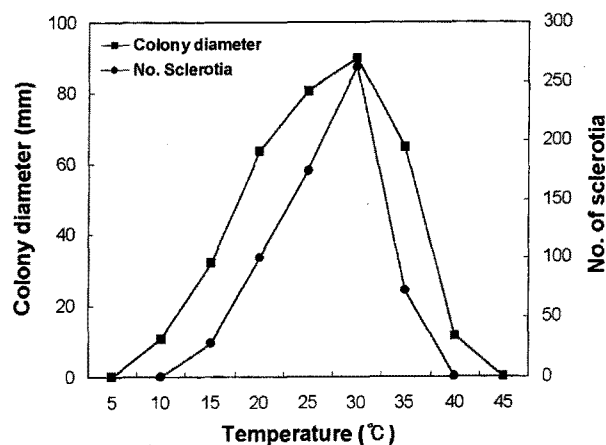


Fig. 1. Effect of temperature on mycelial growth and sclerotia formation of *Sclerotium rolfsii*, the causal organism of stem rot of tatarian aster (*Aster tataricus*). Diameter of mycelial growth of *S. rolfsii* were measured 58 hours of incubation on PDA. The data are mean of three replications (■—■). The number of sclerotia were counted after 20 days of incubation and the experiments were replicated 3 times (●—●).

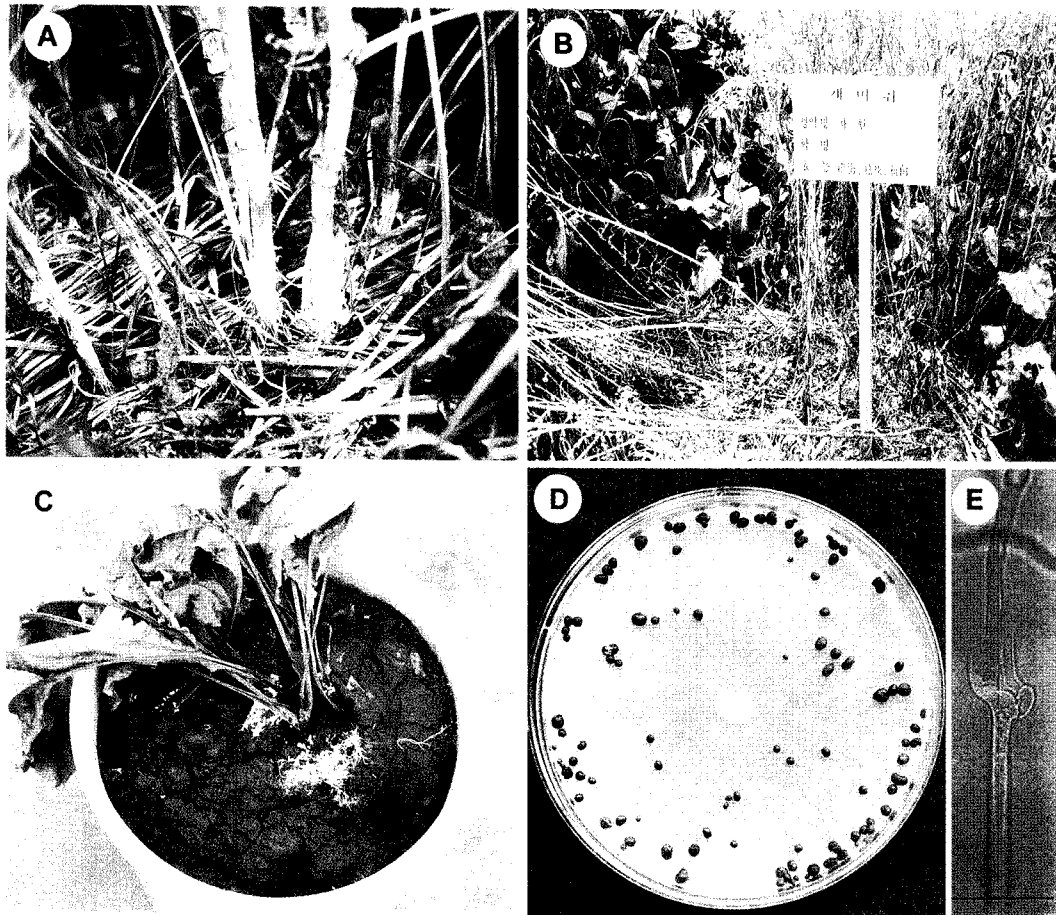


Fig. 2. The symptom of stem rot of tatarian aster (*Aster tataricus*) and morphological characteristics of the pathogenic fungus *Sclerotium rolfsii* on PDA. Typical symptoms on stem (A), Plants infected by *S. rolfsii* in the field (B), (C), Typical brown sclerotia formed on the stem and soil surface, The white mycelia and sclerotia of *S. rolfsii* grown on PDA (D), and Typical clamp connection (E). Scale bar: 20 μ m.

width. This mycelium showed characteristic clamp connection (Fig. 2E).

The maximum number of sclerotia produced on PDA were 262.2 when colonies grown at 30°C on PDA. The sclerotia were not formed when the temperature went down below 15°C or over 40°C. The size of sclerotia were measured 1.0–3.2 mm in diameter and the shapes were sphere (Table 1, Fig. 2D).

Tatarian aster were planted in a Wagner pot (1/5000a) filled with autoclaved soil and cultivated in the greenhouse for 46 days for the pathogenicity test. Inoculum was prepared with mycelial mats from 7 days old culture on PDA. The inoculated plants were placed in moisture chamber in greenhouse. The temperature in the chamber were around 30°C. The fungal isolates obtained from infected tatarian aster revealed high pathogenicity. The inoculation test was replicated three times, the first symptom was appeared 8 days after inoculation and they were eventually died (Fig. 2C).

The pattern of mycelial out growth on infected plant and areal mycelium and clamp connection structure are

considered as the decisive characteristics for differentiating *S. rolfsii* from other species of *Sclerotium*. The characteristics of the present isolates was almost identical with *S. rolfsii* described by previous worker (Farr *et al.*, 1995; Gobayashi *et al.*, 1992; Mordue, 1972). Therefore, the pathogenic fungus of stem rot disease of tatarian aster was identified as *Sclerotium rolfsii*. This is the first report that *S. rolfsii* causes stem rot of tatarian aster in Korea.

Table 1. Comparison of mycological characteristics between the fungus isolated from stem rot of tatarian aster (*Aster tataricus*) and *Sclerotium rolfsii* described by Mordue

Characteristics		Present isolate	<i>S. rolfsii</i> ^a
Colony	color	white	white
Hyphae	diameter	4.2–10.4 μ m	4.5–9.0 μ m
	clamp connection	present	present
Sclerotium	shape	sphere	sphere
	size	1.0–3.2 mm	1–2 mm
	color	brown	brown

^aDescribed by Mordue (1972).

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