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Occurrence of Stem Rot of Wild Aster (*Aster koraiensis*) Caused by *Sclerotium rolfsii* in Korea

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A destructive stem rot of wild aster (*Aster koraiensis*) occurred sporadically some farmers' fields in Guman-myon, Kosong-gun, Kyongsangnam-do in 2000. One of the most severely infected field in Kosong showed 28.6 percent of infection rate. The fungus also caused stem or crown rot and systemic wilt or blight of the plants. 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 around 30°C and did not grow under 5°C and over 45°C and mycelial width were 4.3~10.2 μm. Colony was white, usually many narrow mycelial stand in the aerial mycelium and formed clamp connection. Numerous sclerotia were formed on PDA at 30°C. The shape sclerotia were globoid and 0.8~3.0 × 0.9~3.4 mm in size. The fungus was isolated repeatedly from the infected tissues and confirmed its pathogenecity to wild aster and identified as *Sclerotium rolfsii*. This is the first report on the stem rot of wild aster caused by *S. rolfsii* in Korea.

KEYWORD: ***Aster koraiensis*, *Sclerotium rolfsii*, Stem rot, Wild aster**

Wild aster (*Aster koraiensis* L.) become considered as important ornamental crop in Kyongnam area. Many gardens of public buildings and road side are decorated with wild aster because it has bright color, long lasting flower and it can be readily growns even in harsh environments.

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 have been reported that sclerotia rot disease on wild aster was caused by *Sclertium 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, no scientific report on the sclerotial stem rot of wild aster has been reported in Korea (The Korean Society of Plant Pathology, 1998).

The seedlings of wild aster are massively reared in vinlyhouses or glasshouses then transplanted to open areas in June. In August when the canopy of the plants become densely covered, high temperature and frequent rain predispose wild aster to sclerotium stem rot disease. One of the severely infected farmers' fields in Kosong, Kyongnam area reached to 28.6% infection rate. In infected plants, fungal hyphae grew upward on surface of stems, covered the lesion with a cottony, white mass of mycelium. The white mycelium inside and outside of infected stems, and spread on the soil surface around infected plants which is main source of new infection. The fungus grew into the cortex and slowly or quickly girdles the plants, which eventually die (Fig. 2A, B).

Small and spherical sclerotinia were produced on the surface of lesions. They were white at first but became dark brown after matured 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 ranges for mycelial growth on PDA were 10~40°C, and the optimum temperature was 30°C (Fig. 1).

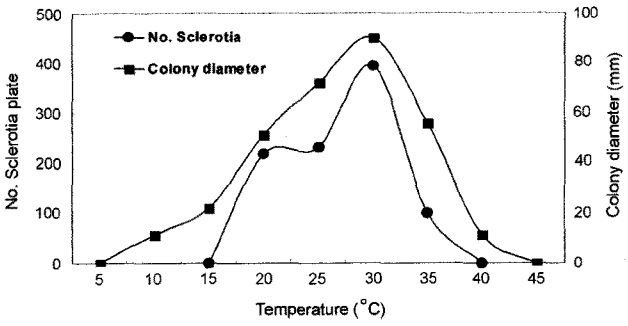

Fig. 1. Effect of temperature on mycelial growth and sclerotia formation of *Sclerotium rolfsii* the causal organism of stem rot of wild aster (*Aster koraiensis*). Diameter of mycelial growth were measured 35 hours after incubation of the pathogenic fungus on PDA. The data are mean of three replications (■-■). The number of sclerotia were investigated three replications 14 days after mycelial growth (●-●).

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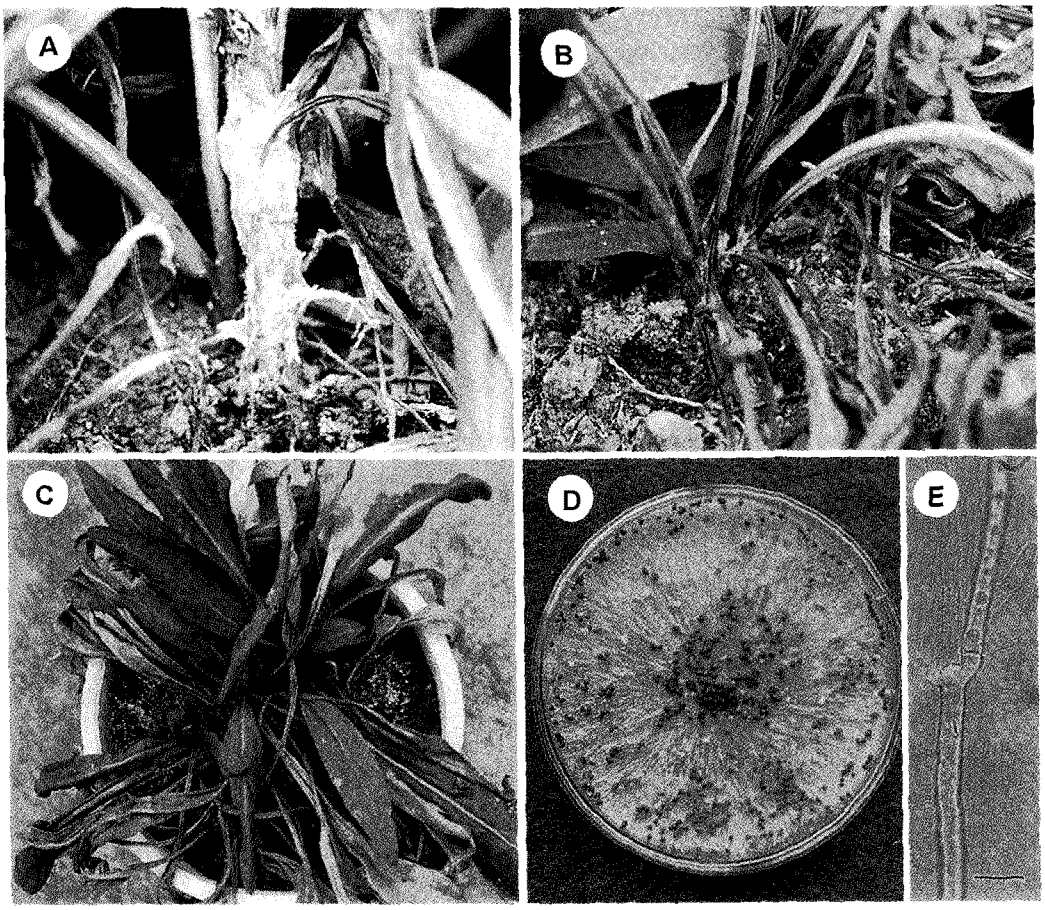

Fig. 2. The symptoms of stem rot of wild aster (*Aster koraiensis*) and mycological characteristics of the fungus *Sclerotium rolfsii*. Typical symptoms on (A) stem and (B) petiole caused by *S. rolfsii* in the field. C: Typical brown sclerotia were formed on the stems and soil surface, D: The white mycelia and scleotia of *S. rolfsii* grown in PDA, E: The typical clamp connection of the hyphae. Scale bar: 10 μm.

The fungus grew very rapidly on PDA, the white mycelium usually formed many narrow mycelial strands in the aerial mycelium and they were measured 4.3~10.2 μm in width. This mycelium showed characteristic clamp connection structure (Fig. 2E).

The maximum production of sclerotia 393.7 were counted on the colonies grown at 30°C on PDA. The number of sclerotia formed on PDA were gradually reduced when the growing temperature went down under 30°C but it reduced sharply when the temperature went up over then 30°C. The sclerotia were not formed when the temperature went down below 15°C or went up over 40°C. The sizes of sclerotia were measured 0.8~3.0 × 0.9~3.4 mm and the shapes were spherical (Table 1, Fig. 2D).

Wild aster was planted in a Wagner pot (1/5000[a]) filled with autoclaved soil and cultivated in the greenhouse for 35 days for the pathogenicity test. Inoculum was prepared with mycelial mats for 4 days culture on PDA. The inoculated plants were placed at 25~30°C in a high humid greenhouse. The isolates obtained from wild aster revealed strong pathogenicity. The inoculation test was replicated three times and initial symptom was appeared 8 days after infection 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 in genus *Sclerotium*. The characteristics of the present isolates were almost identical with *S. rolfsii* described by previous workers (Farr *et al.*, 1995; Gobayashi *et al.*, 1992; Mordue, 1972), There-

Table 1. Mycelial characteristics of the fungus isolated from stem rot of wild aster and *Sclerotium rolfsii* described by Mordue's description

Characteristics		Present isolate	*S. rolfsii*[a]
Colony	color	white	white
Hyphae	diameter	4.3~10.2 μm	4.5~9.0 μm
	clamp connection	present	present
Sclerotium	shape	spherical	spherical
	size	0.8~3.0 × 0.9~3.4 mm	1~2 mm
	color	brown	brown

[a]Described by Mordue (1972).

fore, the causal fungus of stem rot disease of wild aster was identified as *Sclerotium rolfsii.*

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