

Volutella Leaf Blight and Stem Canker on Japanese Pachysandra in the Czech Republic

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Abstract

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Woody ornamental cover plants of Japanese pachysandra (*P. terminalis* S. et Z.) are planted in parks and gardens in the Czech Republic. A serious disease of these plants is Volutella leaf blight and stem canker caused by the fungus *Pseudonectria pachysandricola* (anamorph *Volutella pachysandricola*). It was described by DODGE (1944) in the United States and appeared in Europe in the 1980s. *Volutella pachysandricola* was isolated from Japanese pachysandra (*P. terminalis* cvs. Green Carpet and Variegata) from leaf spots and stem and stolon cankers in Brno in 2000–2003. The tan or brown spots with brown margins, often with concentric zones, develop on infected leaves. Stem and stolon cankers appear as water-soaked diseased areas, the stem often turns brown, shrivels and girdles. The infection often begins in damaged or senescent plant parts and spreads into the healthy tissues. Pink-orange sporodochia with spores form on newly killed stems and leaves during humid spring and summer periods. Ascospores develop in red-orange perithecia on the same tissues.

Keywords: *Pseudonectria*; *Pachysandra terminalis*; Czech Republic

Pseudonectria pachysandricola Dodge, anam. *Volutella pachysandricola* Dodge, is a phytopathogenic micromycete which attacks the leaves, stems and stolons of Japanese pachysandra (*Pachysandra terminalis* L.) and causes Volutella leaf blight and stem cankers (DODGE 1944; SINCLAIR *et al.* 1987; HUDLER *et al.* 1990; ROSSMANN *et al.* 1993). The fungus is widely spread in North America (DODGE 1944; CHILTON 1954; SAMUELS 1977; GOULD & KACKLEY-DUTT 1992; ROSSMAN *et al.* 1993). In Europe it was reported from Britain (SINCLAIR *et al.* 1987), Poland (WOJDYLA *et al.* 2000) and Germany 2001 (NENNMANN 2004). The fungus has not been reported from the Czech Republic so far.

Pachysandra terminalis is considered to be an absolutely hardy plant that does not suffer from any diseases or pests under the conditions of the Czech

Republic (MAREČEK 1999). In 2002, *P. pachysandricola* (*V. pachysandricola*) was detected in the Botanical Garden and Arboretum of the Mendel University of Agriculture and Forestry in Brno in both teleomorphous and anamorphous stages. The anamorph stage was found on the leaves, stems and stolons of *P. terminalis* cv. Green Carpet and on the leaves and the stems of cv. Variegata; the teleomorph stage *P. pachysandricola* was detected only on the stems of *P. terminalis* cv. Green Carpet.

Symptoms

On the leaves regular yellow-brown to brown spots appeared, frequently with concentric lighter and darker zones and dark-brown edges (Figure 1). The spots gradually spread over the whole leaves.

At first the water-soaked green-brown bark cankers appear on the stems, that later dry up and turn brown. The parts above the infected sites then wilt and die. The cankers gradually girdle the whole twig and most of the leaves die off. On the stolons the first cankers often appear at the site of rooting.

Description of the isolated pathogen

teleomorph: *Pseudonectria pachysandricola* Dodge

Perithecia on recently killed browning twigs solitary to gregarious, superficial or slightly immersed in a thin stroma. Red-orange perithecia \pm globose to broadly pyriform, $220\text{--}240 \times 170\text{--}190 \mu\text{m}$, with sparse long setae and numerous short hairs. Setae straight, unbranched, to $120 \mu\text{m}$ long. Hairs $6\text{--}12 \times 5\text{--}7.0 \mu\text{m}$ long, straight, tapering to a round apex, luteous, thick walled ($1.4 \mu\text{m}$ at apex, $2.0 \mu\text{m}$ at base). Asci unitunicate, $46\text{--}58 \times 7\text{--}8 \mu\text{m}$, slightly clavate, with eight spores. Ascospores two-celled, ellipsoid, $8.7\text{--}13.0 \times 3.0\text{--}3.5 \mu\text{m}$, ends rounded, hyaline, thinwalled.

anamorph: *Volutella pachysandricola* Dodge

Sporodochia are formed on newly killed stems and leaves during humid spring and summer periods. Sporodochia regularly scattered, solitary, erumpent, pale, later pink-orange, with sparse hyaline setae at margins. Conidiophores solitary, unbranched, monophialidic $8.5\text{--}18.5 \times 2.6\text{--}3.5 \mu\text{m}$. Conidia unicellular, hyaline, long ellipsoid with

rounded ends, $14\text{--}20 \times 2.8\text{--}4.0 \mu\text{m}$, with two oil-drops.

In culture on PDA, $t = 24^\circ\text{C}$, sparse aerial mycelium near margin, at the centre immersed, slimy, surface of colony salmon-coloured. Conidiophores developing from vegetative hyphae, single, unbranched, monophialidic, $9.1\text{--}17.5 \mu\text{m}$ long, $2.5\text{--}3.5$ wide at base, $1.7 \mu\text{m}$ at apex. Conidia are unicellular, hyaline, long and ellipsoid with rounded ends, $10\text{--}21 \times 3\text{--}4.1 \mu\text{m}$.

Morphological characters and growth rate are consistent with previous reports on teleomorph *Pseudonectria pachysandricola* Dodge and anamorph *Volutella pachysandricola* (DODGE 1944).

Disease cycle

Japanese pachysandra is most susceptible to infection on older parts of the plant and on those parts that have been damaged by exposure to bright sun, winter drying, insect feeding or other factors. The infection often begins in damaged or senescent parts and spreads into healthy tissues. Brown spots show on the leaves 5–9 d after infection; on stems, diseased areas appear water-soaked, they often girdle the stem within 2 weeks of infection. The minute, cushion-shaped sporodochia appear within a few days (6–8) (Figures 2), they produce a number of microscopic, one-celled, colorless conidia. The older sporodochia or stromata produce one or several perithecia ascospores. Conidia and ascospores germinate in moist weather and reinfect pachysandra plants. The spores are disseminated from plant to plant by air and splashing water.



Figure 1. Brown spots on leaves of *Pachysandra terminalis* caused by infection with *Pseudonectria pachysandricola*



Figure 2. Sporodochia of *Volutella pachysandricola* on the stem of *Pachysandra terminalis*

The microclimate of the dense plants is very favourable for the development of the fungus. The frequency of precipitation and/or irrigation of the stand considerably affected the intensity of the fungal attack. The occurrence of the fungus was prominent in the second half of 2003. Due to the irrigation of the stand, the effect of precipitation on the occurrence of the disease could not be evaluated in detail. In the first half of the year, spots on the leaves and stem cankers appeared only sporadically. With increasing temperatures the visual symptoms, particularly on the leaves, receded. An increased intensity of occurrence was not detected until the second half of the year, but did not reach the intensity of the previous year. Owing to the shedding of infected leaves it is very difficult to estimate the damage, a degradation of the aesthetic quality of the undergrowth is more likely.

Infected plants were collected and infection determined: Brno-Černá Pole (6765), 19. IX. 2002, brown blotches on the leaves and dark brown to black necrotic cankered stems with sporodochia on *P. terminalis* Green Carpet; 16. X. 2002, 15. XI. 2002, sporodochia on leaves and stem blight; 10. VI. 2003, sporodochia on blighted stem; 17. V. 2003, perithecia on stems of *P. terminalis* Green Carpet; 10. IX. 2003, rare leaf and stem blight on *P. terminalis* Variegata; 12. X. 2003, 15. XI. 2003, numerous sporodochia on leaves and stems of *P. terminalis* Green Carpet, rare on *P. terminalis* Variegata.

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