

Biology of Microorganisms on Grapes, in Must and in Wine

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4.3.3 *Pseudopezizula tracheiphila* (Müll.-Thurg.) Korf & Zhuang (Helotiales): Rotbrenner

General Aspects. Rotbrenner is locally confined and occurs primarily in warm vineyards with stony soil. In some areas the disease results in severe losses annually, whereas in others it occurs only sporadically or not at all. Lesions on leaves are initially yellow on white and bright red to reddish brown on red cultivars. Subsequently a reddish brown necrosis develops in the center of the lesion, leaving only a thin margin of yellow or red tissue between the necrotic and green areas of the leaf. The lesions are typically confined to the major veins and the edge of the leaf and are several centimeters wide. Early infections occur on the first to the sixth leaf of young shoots, resulting in minor losses. Later infections attack leaves up to the 10th or 12th position on the shoot which result in severe defoliation. In addition, fungus attacks inflorescences and berries causing them to rot and dry out (Mohr et al. 2005).

Taxonomy. The causing fungus of Rotbrenner, *Pseudopezizula tracheiphila* (Müll.-Thurg.) Korf & Zhuang (syn. *Pseudopeziza tracheiphila* Müll.-Thurg.) belongs to its teleomorph *Phialophora tracheiphila* (Sacc. & Sacc.) Korf to the Helotiales (Ascomycetes) (Korf et al. 1986).

Biology and Epidemiology. The source of inoculum of the disease in spring is ascospores which are formed sexually in asci. *P. tracheiphila* appears to be composed of two mating types which exhibit a bipolare heterothallic mating system. Apothecia formed primarily on fallen leaves in the spring, hold the asci with the ascospore. Apothecia may also develop on current-season infected leaves in late

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summer or fall. Depending on weather conditions, apothecia with mature ascospores may be present throughout the season (Perarson et al. 1991). The primordia of the

apothecia mature as soon as the temperature rises at the end of winter. Apothecia development requires sufficient wetness of fallen leaves. Under wet and warm conditions ascospores are released already before bud burst. Heavy rainfall and prolonged surface wetness favour infection and lead to severe disease. Young leaves are susceptible after they reach a width of about 5 cm but the probability of infections increases from the 6-leaf stage. After an incubation period of two to four weeks, the fungus invades the vascular elements of infected leaves, causing symptom development (Reiss et al. 1997). The fungus remains latent if it is unable to invade the vessel elements, in which case it can be isolated from green leaves showing no symptoms. Conditions required for fungus to invade the vascular system are not well understood; however, soil conditions and water supply that place the vine under temporary stress appear to be important factors. Disease incidence and severity depend on the abundance of apothecia on fallen leaves on the ground of the vineyards and on released ascospores. Monitoring of the ascospore release by means of spore traps enables forecast of the disease situation. On malt agar, the anamorph may be formed, with hyaline, septate, short conidiophores that are coarser than vegetative hyphae. Conidiogenous cells are monophialidic and lageniform, with well-defined but thin-walled collarettes. Conidia are ellipsoid, hyaline, and unicellular. Hyphae grow in a characteristic sine-wave pattern that, when observed in the vessel elements of diseased tissue, are considered diagnostic.

A disease very similar to Rotbrenner, called angular leaf scorch, has been described in New York State (Person et al. 1988). The fungus causing angular leaf scorch in North America produces smaller apothecia than *P. tracheiphila*, and its broadly clavate asci has four spores in contrast to the eight-spored European fungus. The American counterpart has been described as a distinct species, *P. tetraspora* Korf, Pearson & Zhuang (anamorph *Phialophora*-type).