

Characterization of genetic loci conferring grapevine black rot (*Guignardia bidwellii*) resistance

Patricia Weber¹, Friederike Rex^{1,2}, Ludger Hausmann¹, Reinhard Töpfer¹

¹Julius Kühn Institute (JKI) – Federal Research Centre for Cultivated Plants, Institute for Grapevine Breeding, Siebeldingen

²State Education and Research Center of Viticulture, Horticulture and Rural Development, Neustadt/Weinstraße

E-mail of corresponding author: ludger.hausmann@julius-kuehn.de

Since years, the EU aims at a reduction of plant protection in viticulture. The reduction of copper, the only approved spray agent to control downy mildew in organic viticulture, is prescribed in the regulation. Breeding of fungus-resistant grapevine varieties by crossing of traditional susceptible *Vitis vinifera* cultivars with resistant American or Asian wild *Vitis* species is a crucial step towards the increase for a sustainable and environmentally friendly viticulture.

One important pathogen in viticulture is the hemibiotrophic ascomycete *Guignardia bidwellii* (according to the latest nomenclature recommendation named *Phyllosticta ampellicida*), which is the causal agent for black rot. Since the beginning of the 21st century, an increased incidence of the disease was reported from regions in Europe, like Germany, Switzerland, Austria, Luxembourg and Romania. Therefore, there is concern that the new bred mildew-resistant grapevine varieties, which are cultivated with reduced plant protection measurements, are prone to black rot infection.

The pathogen hibernates in fruit mummies. Throughout the year, several asexual infection cycles can lead to severe infection of green and expanding parts of the grapevine and can cause massive crop loss. Especially in areas with a warm and humid climate, the vineyards are at high risk of black rot infection.

In 2014, two black rot resistance conferring loci were identified in a V3125 (Schiava Grossa x Riesling) x `Börner` crossing population. The resistance is inherited by `Börner`, an interspecific rootstock variety originating from hybridising two American wild *Vitis* species (*V. riparia* x *V. cinerea*). An extended population of the initial V3125 x `Börner` population is available for fine mapping of the two reported quantitative trait loci (QTL) and finally the development of closely linked markers for marker-assisted selection in grapevine breeding.

The overall goal of this project is to characterize known resistance loci but also to identify new genetic resources for breeding of black rot resistant grapevines. Further characterization of their resistance mechanism (e.g. through microscopy studies) will elucidate, if they are useful for pyramidisation of resistances in breeding programs.