New insights in the molecular structure and function of the resistance locus *Ren3* against powdery mildew (*Erysiphe necator*) from the grapevine cultivar 'Regent'

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Powdery mildew is one of the most devastating diseases of grapevine (*Vitis vinifera* L). The disease is caused by *Erysiphe necator* Schw. (syn. *Uncinula necator* (Schw.) Burr, anamorph *Oidium tuckeri* Berk.), an ascomycete fungus, which was introduced from North America to Europe in 1845. The traditional European cultivars are highly susceptible to the fungus and still today huge amounts of fungicides are necessary to defeat the pathogen.

Many North American *Vitis* species developed resistance against *Erysiphe necator* due to co-evolution of host and pathogen. This process promoted the development of a genetic locus called *Ren3*, which was characterized in the cultivar 'Regent'. There are several genes located within this region, which show great similarity to genes known to mediate resistances in other plants.

Until this day, the resistance locus *Ren3*, located on LG15 of the grapevine cultivar 'Regent', spans an approximate interval of 4 Mb, which contains three different clusters of resistance genes analogs (RGAs). To determine which one of the RGA clusters harbors the gene which causes resistance against *Erysiphe necator* we performed a fine-mapping of LG15 in the crossing populations 'Regent' x 'Lemberger' and 'Regent' x 'Cabernet Sauvignon'.

The results of recent studies suggest an involvement of more than one RGA cluster in the recognition of *Erysiphe necator* over the course of a year. This finding leads to the assumption that we are confronted with more than one *Erysiphe necator* strain which causes Powdery Mildew infections in Germany. Furthermore the sequencing of one of the three RGA clusters could be completed via BAC-clone sequencing.