

CLS 2: Yield and quality affecting pathogens on Horseradish (*Armoracia rusticana*)



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Abstract

Horseradish (*Armoracia rusticana*) is cultivated in the major production area of Germany (Franconia) in a volume of about 1800 tons/year. A survey was conducted during 2012 to 2014 to assess the incidence and severity of diseases in horseradish fields of this area. Fungal leaf pathogens such as White Rust (*Albugo candida*) and various yield effecting leaf spot pathogens (*Alternaria* spp. *Colletotrichum* spp.) have been detected.

Quality losses are mainly due to the soil borne pathogen *Verticillium* spp., which causes discoloration of the vasculars. The problem of infections is that they can be evaluated only after harvest. They cause a critical influence on products as well as planting material. Fungicides are not effective and without authorization. For the identification of three of the main *Verticillium* species, a PCR assay was developed which is less time-consuming than the microscopic scoring of microsclerotia. A screening of affected fields revealed that the two most represented species are *V. dahliae* and *V. longisporum*, whereas *V. tricorpus* is of lower meaning. In a survey of storehouse diseases mycotoxigenic species such as *Penicillium* spp., *Aspergillus* spp. and *Fusarium* spp. have been detected additionally.

Furthermore, various aphids (e.g. *Mycus persicae*) are of evidence as vector of viral diseases such as Turnip mosaic virus (TuMV). Through meristem tip culture virus elimination has been carried out and propagation of virus-free plants were propagated by tissue culture in order to assess the effect on yield of TuMV-infections.

Moreover mycobiome analysis of horseradish were made. Beside the species *Verticillium* spp. also *Fusarium* spp. and a bacterial complex composed mainly of the three species *Stenotrophomonas* spp, *Burkholderia* spp. and *Serratia* spp. have been identified. Interestingly, in greenhouse experiments infections with the bacterial complex composed of these bacterias horseradish seem to be protected against fungal infections such as *Verticillium* spp. and *Fusarium* spp. Hence, using competitive, non pathogenic bacterial species are assumed to avoid fungal infections.

As registered varieties are not available in Germany, plants cultivated in Franconia originate of perennial plant propagation, which leads to a high risk of the accumulation of diseases. This points up breeding of horseradish cultivars with desirable characters such as resistance to plant pathogens would be necessary.

References

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