

25-3 - Factors stimulating germination of *Plasmodiophora brassicae* resting spores in the soil

Stimulationsfaktoren für die Keimung der Dauersporen von Plasmodiophora brassicae im Boden

Yao Wang¹, Anna Rathgeb², Petr Karlovsky², Andreas von Tiedemann¹

¹Georg-August-Universität Göttingen, Department für Nutzpflanzenwissenschaften, Abteilung für Pflanzenpathologie und Pflanzenschutz, Grisebachstr. 6, 37077 Göttingen

²Georg-August-Universität Göttingen, Department für Nutzpflanzenwissenschaften, Abteilung für Molekulare Phytopathologie und Mykotoxinforschung, Grisebachstr. 6, 37077 Göttingen

Clubroot is one of the most serious soil-borne diseases of cruciferous crops worldwide. It is caused by the obligate biotrophic parasite *Plasmodiophora brassicae*. The resting spores of *P. brassicae* are extremely robust and tolerant to adverse conditions which allow them to survive in soil for a long period of time. External biotic and abiotic stimulants are crucial for breaking the dormancy which is essential to initiate germination and plant root infection. Our studies focus on the role of plant root exudates and the soil microbiome on the germination of resting spores. To exclude any modulations of root exudates by soilborne and root-associated microbes, a sterile cultivation system for continuous trapping of root exudates from undisturbed living roots was established. Plants were grown in a solid substrate and root exudates were captured in XAD resin columns. Native root exudates collected from host and non-host plant species were tested in bioassays for their potential to trigger the germination of *P. brassicae* resting spores. Furthermore, aqueous soil extracts and several bacterial strains isolated from different soil samples were examined for the induction of resting spore germination. The results indicate that soil bacteria are essential for the stimulation of resting spore germination rather than native root exudates. 16s rRNA amplicon analysis revealed that the shift of bacterial community induced by certain nutrient environments is related to the germination of resting spores. Linking these factors of host and microbe interactions with their respective environments offers a novel perspective for better understanding the ecology of *P. brassicae* in the soil and thus for the development of innovative strategies of disease control.

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25-4 - Einfluß von Bodenfaktoren auf die Dormanz und Keimung der Mikrosklerotien von *Verticillium longisporum*

Soil factors determining dormancy and germination of microsclerotia of Verticillium longisporum

Sarenqimuge Sarenqimuge, Andreas von Tiedemann

Georg-August-Universität Göttingen, Department für Nutzpflanzenwissenschaften, Abteilung für Pflanzenpathologie und Pflanzenschutz, Grisebachstr. 6, 37077 Göttingen

Verticillium longisporum poses a serious threat to many brassicaceous crops, including the economically important oilseed rape. During the non-parasitic phase, *V. longisporum* survives as microsclerotia in the soil. When the next oilseed rape crop is planted, dormant microsclerotia will germinate and infect the roots. However, the factors and processes in soil regulating dormancy and germination of microsclerotia are still unclear. Hence, a series of experiments was conducted to explore the effects of soil moisture, nutrients and the soil microbiome on microsclerotia germination. Microsclerotia were cultured under sterile and unsterile conditions *in vitro* at different moisture levels in order to determine the factor effects on germination. The results showed that under sterile conditions water can stimulate microsclerotia very effectively, displaying a positive correlation between moisture levels and germination rates. The higher the humidity level, the more and faster microsclerotia germinated. In contrast, under unsterile conditions, humidity had no such effect and microsclerotia did not germinate even at the highest moisture levels. Furthermore, an *in vivo*