Detection of *Puccinia pimpinellae* (anise rust) in *Pimpinella anisum* (anise)

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To promote domestic medicinal plant cultivation and to ensure product quality, the junior research group Medicinal Plants was established at the Julius Kühn Institute in 2020 (funded by FNR: 22002818). The focus of the research was, among other things, on the "expansion through optimisation of the cultivation of anise (*Pimpinella anisum*)" and the investigation of "fungal pathogens" that can currently be observed in the field and the associated problems. Within the framework of a broad-based monitoring of fungal pathogens over several years, massive infections with rust (*Puccinia pimpinellae*) were repeatedly observed. *P. pimpinellae* poses a great challenge for cultivation, as the infestation can lead to massive yield losses and a significant reduction in the quality of the harvested crop.

Infections with *P. pimpinellae* can be caused by spores present in the environment as well as by infected seeds. Interestingly, spore deposits were only found on stems, leaves and flowers shortly before the plants flowered. This observation raised the question of whether the plants were only infected at this time or whether the seedlings are already infected, the fungus latently colonises the plant and only switches to a pathogenic phase with vegetative and generative reproduction at the time of flowering.

To clarify this question, the organs of anise seedlings were to be checked for colonisation by *P. pimpinellae* at different times. Since the rust fungus is obligate biotroph and accordingly cannot be isolated, a culture-independent detection method was first verified by conventional PCR using genus-specific primers.

To investigate colonisation, seedlings were grown from infested seeds and harvested at two time points. Roots, hypocotyl, cotyledons and first leaves were analysed separately. It was found that *P. pimpinellae* could already be detected in early seedling stages. The results demonstrate that latently infected plants emerge from infected seeds and underline the need to use healthy seeds to prevent early infection of crops and minimise the spread of *P. pimpinellae*. To this end, seed batches could be routinely screened for the pathogen. In the case of contaminated seed, the pathogen concentration could be significantly reduced by different seed treatments. Initial trials on seed treatment have already been successfully carried out. The results still need to be confirmed in the future.