Establishment of efficient strategies for controlling downy mildew (*Peronospora salviae-officinalis*) and other pathogenic fungi on common sage (*Salvia officinalis*)

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Sage (*Salvia officinalis*) is an important niche culture in Germany providing high revenues through a complex value chain. Since ancient times, sage has been used as a medicinal plant to cure many different diseases and as a spice plant in the kitchen as well. Because sage is a perennial plant, the stands can be used up to 5 years and all plant organs (stem, leaf, flower and root) are used for a variety of medical products. Therefore pathogen control is crucially important to avoid the build-up of pathogen populations.

Currently, sage cultivation in Germany is threatened by emerging diseases: A downy mildew pathogen (*Peronospora salviae-officinalis*) has been spreading through Central European sage cultures in the last few years. This parasite is specific for sage and has only been classified as a species of its own in 2009. Additionally, problems by stem and root diseases caused by *Phoma exigua* var. *exigua* have intensified. Together, the two pathogens have caused yield losses of up to 50% in some areas in Germany recently.

Because downy mildew on sage is a newly emerging disease, hardly anything is known about this pathogen. Therefore, the main aims of the present project are to elucidate the biology and epidemiology of the two pathogens on sage. Specifically, we want to (1) investigate and reproduce the infection process in climate chambers. (2) Develop a specific, sensitive and quantitative method for detecting the pathogens in seed and soil samples using qPCR. (3) Monitor the distribution and spread of the pathogens in sage cultivation throughout Germany. Taken together, better understanding of the epidemiology and infection biology of the two pathogens will help providing advice for pathogen control and sustainable sage production.