

Using infection studies and molecular techniques to investigate differences in virulence of the agent causing dieback on ash trees (*Hymenoscyphus fraxineus*)

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The causal agent of ash dieback *Hymenoscyphus fraxineus* [synonym: *H. pseudoalbidus*, anamorph: *Chalara fraxinea*], is a non-native fungal pathogen from Asia that was first detected in 2002 in northern Germany. The main symptoms on the European ash (*Fraxinus excelsior*) include shoot dieback, as well as necrotic lesions on leaves, stems and root collars. These symptoms cause reduced tree vitality, reduced timber quality, and tree mortality. The pathogen is associated with significant economic and ecological damages, and it continues to threaten the survival of ash populations across Europe.

Further insights into disease development are necessary to improve disease management. As part of the FraxForFuture project, we will analyse virulence, infection properties and population structures of the pathogen using molecular techniques and infection studies. More specifically, we will determine whether virulence is connected with genetic structure, plant tissue material or geographic distribution using microsatellite analysis. We will use standardised protocols for inoculation and also develop new protocols for strain rejuvenation and ascospore suspensions to more closely replicate natural infection processes and disease development in saplings under greenhouse conditions.

We will also perform infection studies for our project partners to investigate the influence of viruses and fungal endophytes on the virulence of the pathogen and disease expression. It may be possible for naturally occurring antagonists to be used as a biological control of the pathogen.

Together with our project partners, we will also study the development of root collar necroses and contribute to the determination of their aetiology, as they are known to accelerate the decline of infected trees. Overall, the project will contribute further insights into the pathogen, which will facilitate the development of new and existing strategies for disease management in Germany.