- The only chance to conserve common ash lies in a high genetic heritability of dieback resistance

- Verifying the resistance of common ash in the field

- Selection of several hundred resistant ash individuals from whole Austria

Numerous studies in Austria and other European countries have shown that in heavily infested stands there are always some individuals which apparently possess defence mechanism or even have a very high natural resistance against the ash dieback pathogen. Several ash clones in Austrian seed orchards appear to be resistant or less susceptible against the ash dieback.[9]

Current research has provided evidence that a large part of ash dieback resistance has a genetic basis, i.e. the heritability of resistance against this disease is high. The resistance can thus be inherited to offspring and a balance of pathogenicity and resistance could emerge by natural selection. Such adaptation processes take, unfortunately, many tree generations and the setting of a natural equilibrium might last a few hundred to thousands of years. The main problem in the natural development of resistant stands is the scattered allocation of resistant trees and the fact that ash is trioecious: it is difficult for surviving resistant ash trees to find a mating partner to pass the genetically based resistance to following generations.



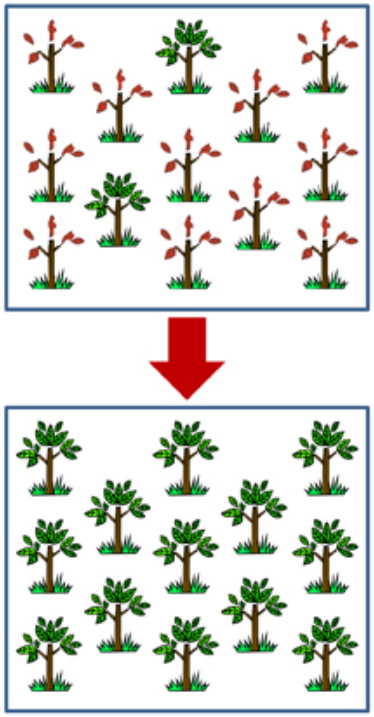
The utilization of resistant trees to produce resistant reproductive material of ash is a promising approach to maintain on the one hand ash as one of the main hardwood species in Austria for forestry and nature conservation and to compile healthy ash populations for future reforestation and restoration projects on the other hand.

The Austrian Research Centre for Forests (BFW) together with the University of Natural Resources and Life Sciences, Vienna (BOKU) has started the project „Ash in distress“ in order to identify resistant ash trees throughout Austria, to check their disease resistance and to bring

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them together in medium term in seed orchards.

What objectives are pursued?



The set-up of new ash clone seed orchards with a large number of locally adapted and superiorly resistant clones from all over Austria is aspired.

Several hundred resistant genotypes should be selected to capture the entire genetic diversity of common ash, to prevent a „arms race“ with the ash dieback pathogen, as well as to establish a breeding base of resistant clones without diminishing the gene pool.

The breeding value of the selected mother trees will be calculated based on the performance of single tree offspring in a common garden experiment. In a further step male trees (putative fathers) of these offspring will be identified by paternity analysis, needed to select male ash trees for a future seed orchard.

Both the best mother and father trees as well as especially resistant offspring are to be propagated by grafting and cuttings, to preserve their genetic information. Vegetatively propagated plants shall also be provided to end users, providing resistant reproductive material to forest managers, as a direct output of the project.

[9] Kirisits, T., Freinschlag, C. (2012) Ash dieback caused by *Hymenoscyphus pseudoalbidus* in a seed plantation of *Fraxinus excelsior* in

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Austria. Journal of Agricultural Extension and Rural Development 4: 184–191.

Fotos: Kirisits, Schüler

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