

## FORESTS Oak or oak? Genetics assists with species identification



Taking leaf samples from oak trees is far from simple.

It's all very complicated: pedunculate oak has very short petioles and auricles on the leaf base. The leaves of the sessile oak have no auricles; instead, they have stellate hairs on their underside, similar to downy oak leaves, although these have clustered hairs. Even the experts struggle to reliably identify oaks every time – particularly as the species also hybridize. Since the three oak species are likely to cope with future climate conditions such as drought with varying degrees of success, it's important that researchers and forest management are able to identify them correctly.

As part of FOEN and WSL's 'Forest and climate change' research program, Christian Rellstab investigated whether genetic markers, leaf characteristics (leaf morphology) or a combination of the two most reliably allow for species identification. He and his colleagues collected leaves in 71 oak tree populations and from 20 trees in each population. They used these to investigate the genetic fingerprint of the trees in the laboratory, and to record features such as shape, the course of leaf veins and the tiny hairs on the underside of the leaf using a stereo lens.

The most reliable differentiation was achieved by the combination of genetics and leaf characteristics. "Many people see traditional morphological methods and genetics as antithetical," explains Rellstab, "but when it comes to species that interbreed and are morphologically similar, they complement each other." Nevertheless, his study also recommends restricting analyses to genetics, given this is being examined anyway. Morphological analyses are particularly time-consuming, and purely genetic examinations deliver results that are almost as good as those achieved through a combination of the two methods. Furthermore, hybrid trees do not always demonstrate intermediary morphological features – genetic analysis, on the other hand, delivers clarity. (*bio*)

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