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Title: Compositional variances in cuticular lipids of wild and domesticated barley leaves and their impact on plant-environment interactions

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One of the oldest cereal crops, barley is thought to have been domesticated around 8,000 years ago, in the Fertile Crescent. In this study, we explore the understudied contribution of cuticular lipid metabolism to barley domestication. We performed comparative analysis of wild and domesticated barley cultivars' leaf cuticle morphology and chemistry combined with phenotypic characterization, multiple microscopical approaches, Gas Chromatography-Mass Spectrometry (GC-MS) metabolite profiling, transcript expression analyses and Li-6800 measurements of leaf gas exchange capacities. In addition, we conducted a series of inoculation assays with *Blumeria graminis f.sp. hordei* (Bgh), the causal agent of powdery mildew in barely. The results indicate that the leaves of wild barley are more densely covered with epicuticular waxes compared to domesticated leaves with distinct compositions, but both variants contain a similar cuticle ultrastructure. This variance, along with different leaf stomata densities, leads to distinct gas exchange capacities. Our data suggest that the disparate wax content and composition between the varieties has no apparent effect on the Bgh pre-penetration processes. Overall, the results provide novel insight into the compositional variances in cuticular lipids of wild and domesticated barley leaves and their impact on plant-environment interactions.

Biography

Hagai Cohen obtained his PhD in Plant Molecular Biology in the Faculty of Biology at the Technion–Israel Institute of Technology, Israel, investigating the regulatory metabolic pathways involved in amino acid biosynthesis in plant seeds. It is then where he started to focus on metabolism in plants. During his Postdoctoral Fellowship at the Weizmann Institute of Science, Israel, he investigated the metabolic pathways leading to the formation of lipophilic barriers in plants such as epicuticular waxes, cutin, suberin and lignin. In early 2020, he opened his independent laboratory as a Principal Investigator in the Department of Vegetable and Field Crops, the Institute of Plant science at the Agricultural Research Organization (ARO), Volcani Center, Israel. His group is interested in elucidating various aspects of interactions between plant surfaces and pathogens, with a particular focus on metabolic networks operating on the course of pathogenic attack and invasion.'