Genetic differences in barley govern the receptiveness to priming agent

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Priming crop plants for enhanced resistance using biocontrol agents is an efficient disease management strategy, since it results in robust resistance and higher yield. The beneficial effects of the bacterial quorum sensing (QS) molecules e.g. *N*-acyl homoserine lactones (AHL) on resistance and plant growth have been shown in different plant species. Here, we present the effects of the AHL, oxo-C14-HSL, on the priming capacity of barley. We demonstrated that barley primed with *Ensifer meliloti*, expresses enhanced resistance against *Blumeria graminis.* We also showed that the capacity to induce priming varies among different barley genotypes. Among a set of barley genotypes, we identified "*primable*" genotypes that had better ability to enhance resistance and "*non-primable*" genotypes that were non-responsive to oxo-C14-HSL and therefore, did not have any ability to enhance resistance. This suggests that appropriate genetic background is required for AHL-induced priming. We further showed that priming for enhanced resistance in barley involves stronger activation of the barley ortholog of the MPK6, regulation of defense-related *PR1* and *PR17b* genes and remodeling of the cell wall structure. Noticeable was the stronger accumulation of lignin upon priming after a chitin challenge. Interestingly, the global metabolomic changes in barley during priming are rather subtle and specific. Identification of these metabolites is important as it opens doors to study the mechanisms and understand the relation between the plant genomic background and the priming agent. This understanding would further increase the efficacy of priming approaches and lead to novel breeding and plant protection strategies.