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# CHARACTERISATION OF KEY REGULATORY GENES CONTROLLING ROOT ARCHITECTURAL TRAITS IN BARLEY

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Root traits represent targets of increasing interest to improve the sustainability of agriculture. Barley, like maize, rice and wheat, represents an important cereal crop, yet their root traits remain poorly characterised genetically. To address this, we screened a barley TILLING population (TILLMore) by using root phenotyping techniques such as rhizotrons and X-Ray Computed Tomography (CT). We have identified mutants disrupting key root traits such as length and angle. When combined with genetic techniques such as bulk segregant analysis (BSA) and next generation sequencing (NGS) techniques, we were able to identify SNP mutations in several important root trait genes. These included the auxin transporter HvPIN1 which, when mutated, disrupts root growth and vascular organisation. In contrast, mutations in HvEGT1 (Enhancing Gravitropism 1) exhibit a very steep gravitropic root phenotype. These genes promise to provide part of a tool kit for breeders to develop more stress resilient crops.