Project title: Improving cereal grain quality under water-deficit stress – transgenerational inheritance through microRNAs

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Sustainable agriculture largely relies on maximising crop production and quality under the challenges of climate change. Epigenetic regulators like microRNAs (miRNAs) are new targets for improving crop yield and grain quality as well as tolerance to environmental stresses. Plant miRNAs can provide stress memory to recurring abiotic stress within the generation. However, we know little about how to utilise miRNA-conferred stress tolerance in the progenies and its potential application in molecular breeding. The project aims to 1) investigate the effects of water deficit-stress priming to the first generation on the performance of the successive generation in durum wheat germplasm; 2) assess the association between miRNA dynamics, physiological activities, grain yield and quality; 3) evaluate the transgenerational effects of miRNA-conferred stress tolerance and its potential value in next-generation breeding. The outcomes could provide new opportunities for crop improvement using miRNA-based technologies, geared to facilitate the development of sustainable agriculture.