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PALE-GREEN CROPS FOR A NEW SUSTAINABLE AGRICULTURE

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Renewable energy, circular economy and climate change are issues closely related to agriculture, which requires new approaches to increase production, while reducing waste and mitigating climate change. Although crops have been subjected to continuous genetic improvement, some traits have not been investigated and selected in modern cultivars. An interesting trait to investigate is the reduced leaf chlorophyll content and its potential impact on canopy photosynthesis efficiency and crop yield. In our lab, we are currently characterising and mapping several pale-green barley mutants isolated from the chemically mutagenized TILLMore population in cv Morex genetic background. These mutants, selected under field conditions for reduced leaf chlorophyll content and increased photosynthetic efficiency, are currently studied at molecular and physiological level under greenhouse conditions. In this frame, the mutation responsible for the *TM-2490* mutant phenotype has been mapped in the *Hv_CHLI* locus and the SNP, causing an amino acid substitution, identified. The CHLI protein is the smallest subunit of the Mg-Chelatase complex, which is responsible for the insertion of Magnesium in the protoporphyrin IX, a key step in chlorophyll biosynthesis. In particular, the amino acid residue substitution is located in the ATP-binding site of the enzyme, resulting in a reduced Mg-Chelatase activity. Data on the detailed characterization of this mutant under greenhouse and field conditions are provided, together with perspectives related to the cultivation of pale-green, high albedo,

crops in combination with agri-photovoltaic plants.

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