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THE BEAN *LOW PHYTIC ACID 1* MUTATION IS DUE TO A DEFECTIVE MRP TRANSPORTER, AFFECTING THE REGULATION OF PHYTIC ACID PATHWAY, SEED MYO-INOSITOL CONTENT AND SEED GERMINATION SENSITIVITY TO ABA, BUT DOES NOT IMPACT PERFORMACES UNDER ABIOTIC STRESSES.

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We had previously identified the *lpa1* (low phytic acid) 280-10 line that carries a mutation conferring a 90% reduction of phytic acid ($InsP_6$) content. In contrast to other *lpa* mutants, *lpa1(*280-10) does not display negative pleiotropic effects. We have now identified the mutated gene and analysed its impact on the phytic acid pathway.

We mapped the *lpa1(*280-10) mutation by bulk analysis on a segregating F_2 population, then, by comparison with the soybean genome we identified and sequenced a candidate gene. $InsP_6$ pathway was analysed by gene expression and metabolites quantification. The mutated *Pvmrp1(280-10)* cosegregates with the *lpa1*(280-10) mutation, and the expression level of several genes of the $InsP_6$ pathway are reduced in the *lpa1*(280-10) mutant as well as inositol and raffinosaccharides content. *PvMrp2*, a very similar paralog of *PvMrp1,* was also mapped and sequenced. The *lpa1* mutation in bean is likely due to a defective *Mrp1* gene (orthologous to the *lpa* genes *AtMRP5* and *ZmMRP4*), while its *Mrp2* paralog is not able to complement the mutant phenotype in the seed. This mutation appears to down-regulate the $InsP_6$ pathway at transcriptional level, altering inositol-related metabolism, and affecting seed germination ABA sensitivity.

The mutant was also tested for drought response and low phosphorous nutrition, showing in both cases no difference in terms of photosynthetic performances or tissue phosphorous content. Finally, a whole transcriptome microarray analysis was carried out for the low phosphorous treatment, for which the data is currently under preliminary evaluation.