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A MUTATION IN THE PENTATRICOPEPTIDE REPEAT-CONTAINING GENE *EMPTY PERICARP-4* AFFECTS SEED DEVELOPMENT IN MAIZE

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The pentatricopeptide repeat (PPR) family represents one of the largest gene family in plants, with more than 440 members annotated in *Arabidopsis*. Studies conducted on some individual members of the PPR family indicate that these proteins are localized to organelles where they participate in gene expression. A similar picture emerges from a genomic study conducted in *Arabidopsis* which show that PPR proteins are localized in mitochondria and chloroplasts. Thus PPR proteins are thought to be important for transcriptional and postranscriptional processes in organelles. Mutant analyses have shown that *Arabidopsis* PPR proteins retain an essential, non-redundant role in embryogenesis. We will present the characterization of *emp4*, a mutant in a maize PPR gene, which confers a seed lethal phenotype, as a result of severely impaired endosperm development. The *emp4-1* mutation was identified in an active *Mutator* population and co-segregation analysis showed that it was due to a *Mutator3* element insertion. Evidence for e*mp4* molecular isolation was provided by a reverse genetic strategy that resulted in the isolation of four additional *emp4* alleles. *emp4* defines a novel single copy maize *emp* gene, located on the long arm of chromosome 1. Its product contains nine repeats of the 35-aa pentatricopeptide motif and it exhibits a highly conserved structure with two already identified *Arabidopsis* PPR proteins as well as with the product of a unique rice sequence. The PPR product of *emp4* is required for the correct differentiation of endosperm domains and in particular for basal endosperm transfer layer (BETL) differentiation. A GFP fusion construct with the entire EMP4 protein localizes to mitochondria, suggesting a possible role for the protein in these organelles.