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Control of lateral meristem formation in *Antirrhinum majus*

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Abstract

Plant architecture is designed by shoot growth and branching developing from axillary meristem. Lateral meristem formation has been already studied in model plants, e.g. *Arabidopsis thaliana*, tomato, rice and maize (Wang and Li, 2008). The characterization of plant architecture mutants pinpointed that GRAS transcription factors *LATERAL SUPPRESSOR* regulate the initiation of axillary meristem (Schumacher et al., 1999; Greb et al., 2003). The *Solanum lycopersicum lateral suppressor* (*ls*) mutant and its orthologous in *Arabidopsis thaliana las* are unable to develop secondary meristems at the axil of leaves. Indeed, these mutants develop a single stem and do not form secondary inflorescences. In tomato *ls* flowers do not develop petals and are characterized by reduced female and male fertility.

Also in *Antirrhinum majus LAS* orthologous (named *ERAMOSA*/*ERA*) greatly contributes to design plant architecture. Here we show that *eramosa* mutant does not develop axillary meristem, whilst the apical meristem itself is bigger. Moreover *era* mutant forms very few flowers completely disorganized. Preliminary results suggest also that *ERA* is involved in the control of ovule number since the mutant presents less ovules respect to the wild type. Differently from its orthologous in Arabidopsis and tomato, *ERA* is indeed likewise expressed in the ovule primordial.

ERA designs plant architecture

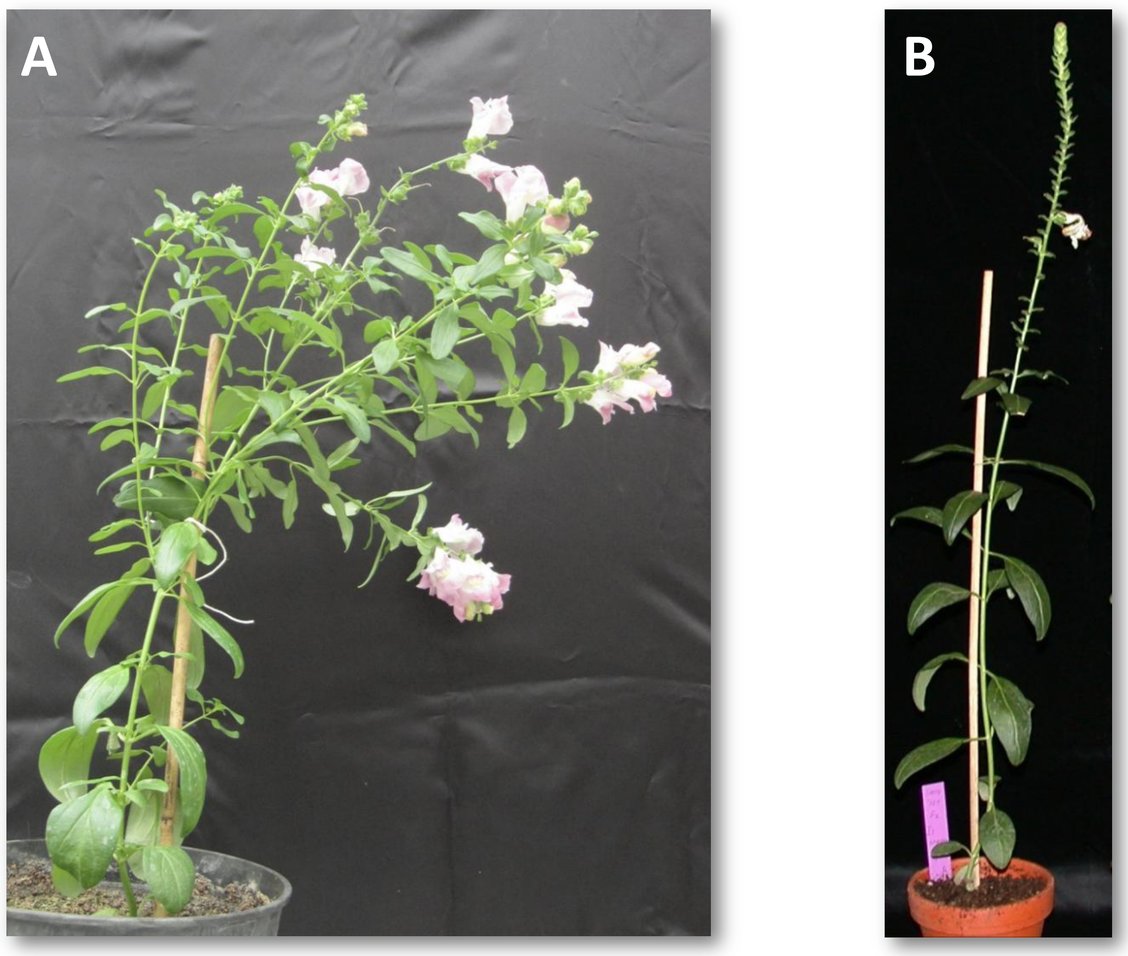

Figure 1: (A) *Antirrhinum majus* WT plant. (B) *eramosa* mutant in which lateral branching is compromised both during vegetative and reproductive stages.

ERA expression pattern

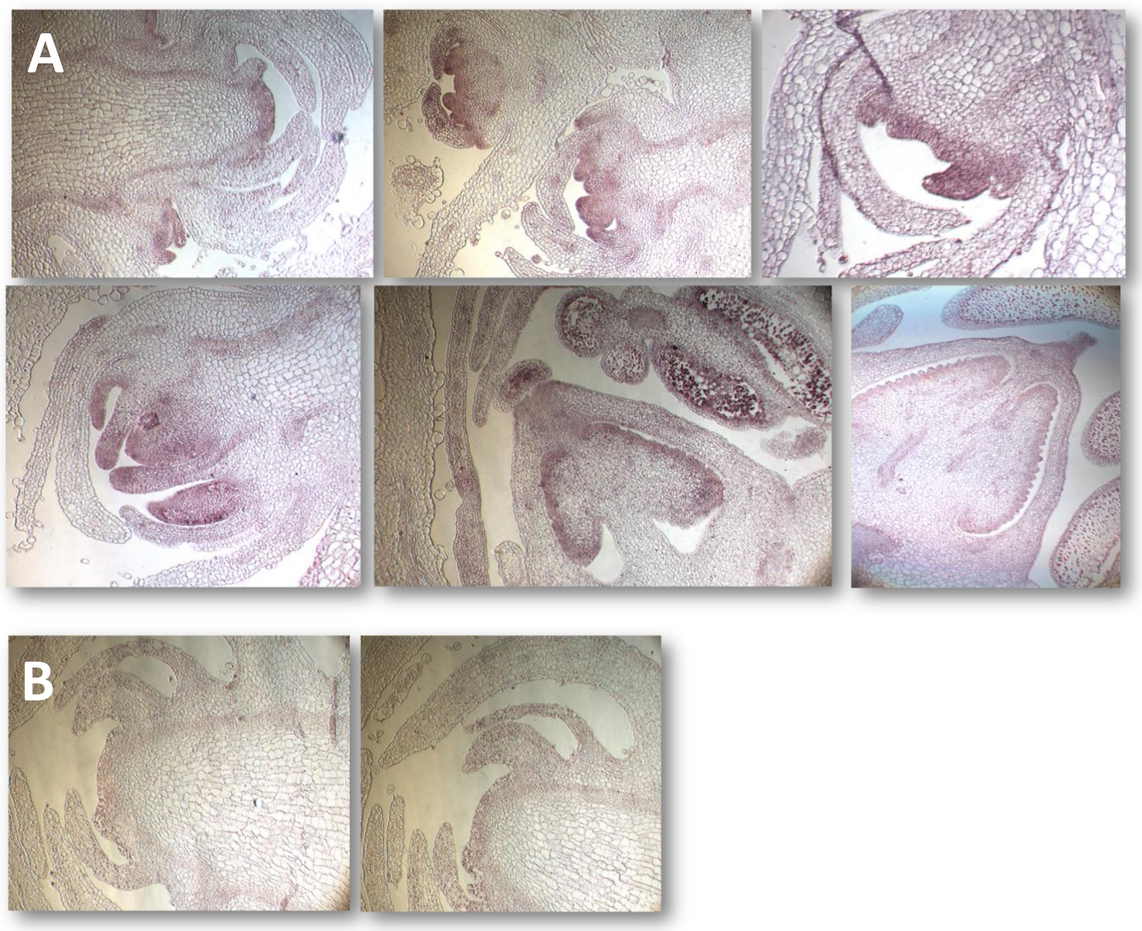

Figure 3: (A) Patterns of *ERA* mRNA accumulation during reproductive development, in the shoot apical meristem (SAM) and in different floral stages. *ERA* is expressed in the SAM and in the floral organs, especially in the ovules. (B) Details of *era* inflorescence for negative control of *in situ* hybridization analysis.

eramosa inflorescence

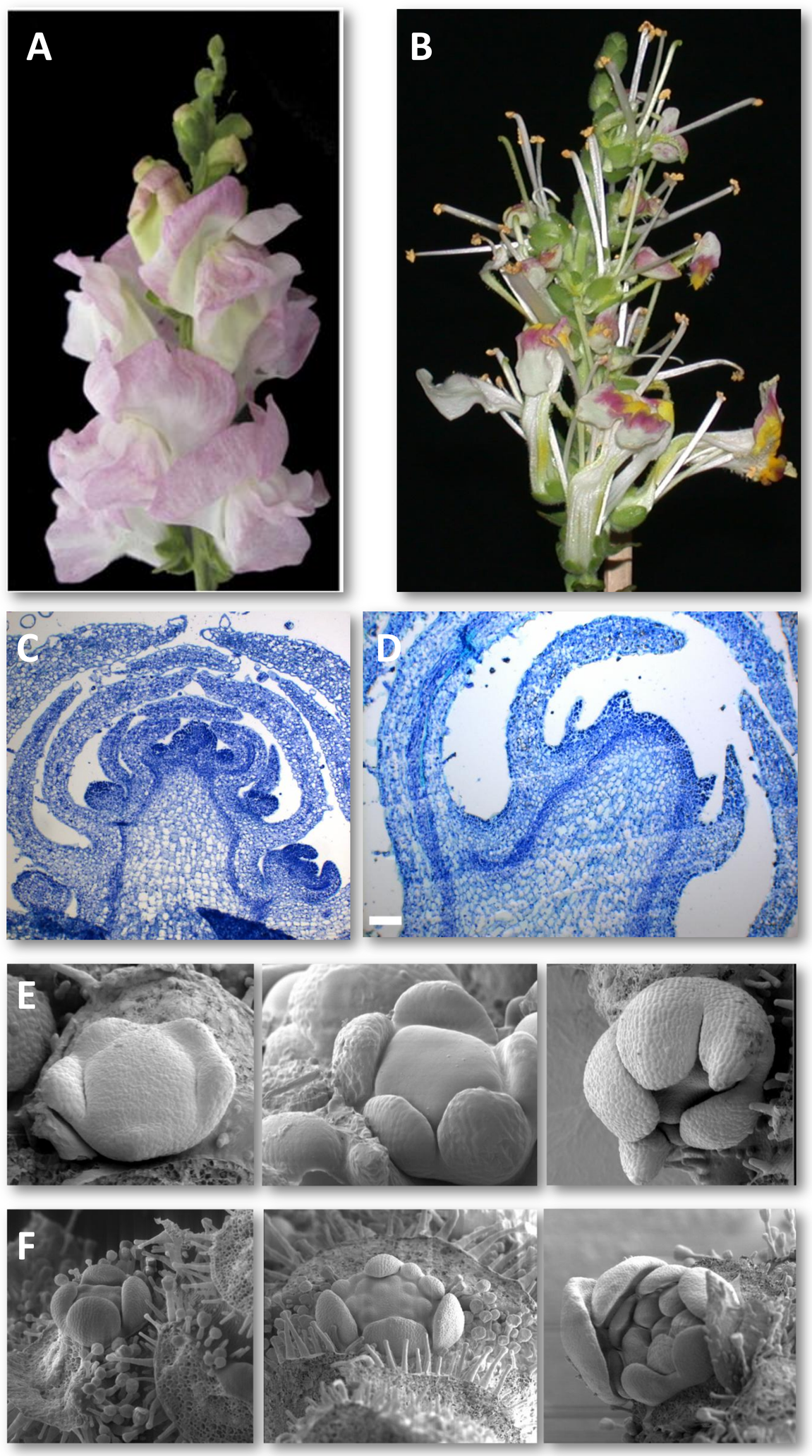

Figure 2: (A) WT inflorescence. (B) *eramosa* mutant inflorescence with some flowers completely disorganized. (C) Detail of WT inflorescence with the shoot apical meristem (SAM) on the top and the first floral primordia at the axil of the bracts. Staining with blue toluidine. (D) Detail of *era* inflorescence with the SAM on the top and without floral primordia at the axil of the bracts. Staining with blue toluidine. (E) Scanning electron micrographs of WT floral primordia at different stages. (F) Scanning electron micrographs of *era* floral primordia at different stages.

Conclusion

All together our data clearly indicated that Antirrhinum *ERA* participates in diverse functions and display broader, but distinct, expression pattern in comparison to the Arabidopsis *LAS* and the tomato *LS*.