**Abstract**

The *Arabidopsis thaliana* KNAT7 (KNOX family) and MYB75 (MYB family) transcription factors were each shown earlier to interact in yeast 2-hybrid assays, and to modulate secondary cell wall formation in inflorescence stems. We demonstrate here that their interaction also occurs *in vivo*, and that specific domains of each protein mediate this process. The participation of these interacting transcription factors in secondary cell wall formation was then extended to the developing seed coat through use of targeted transcript analysis and SEM in single loss-of-function mutants. Novel genetic and protein-protein interactions of MYB75 and KNAT7 with other transcription factors known to be involved in seed coat regulation were also identified. We propose that a MYB75-associated protein complex is likely to be involved in modulating secondary cell wall biosynthesis in both the Arabidopsis inflorescence stem and seed coat, and that at least some parts of the transcriptional regulatory network in the two tissues are functionally conserved.