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A GUARD CELL-SPECIFIC MYB TRANSCRIPTION FACTOR REGULATES STOMATAL MOVEMENTS AND PLANT DROUGHT TOLERANCE

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Stomatal pores located on the plant epidermis regulate the uptake of CO_2 for photosynthesis and the loss of water by transpiration. The opening and closing of the pore is mediated by turgor-driven volume changes of two surrounding guard cells. These highly specialized cells integrate internal signals and environmental stimuli to modulate stomatal aperture for plant survival under diverse conditions. Modulation of transcription and mRNA processing play important roles in controlling guard cell activity, even though the details of these levels of regulation remain mostly unknown. We have identified the *AtMYB60* gene of *Arabidopsis*, as the first transcription factor involved in the regulation of stomatal movements. *AtMYB60* is specifically expressed in guard cells and its expression is negatively modulated during drought. A null mutation in *AtMYB60* results in the constitutive reduction of stomatal opening and in decreased wilting under water stress conditions. Transcript levels of a limited number of genes are altered in the mutant, many of which involved in the plant response to stress. Our data indicate that AtMYB60 is a transcriptional modulator of physiological responses in guard cells and open new possibilities to engineering stomatal activity to improve plant survival to desiccation.